Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves
PUBLISHED WEEKLY BY THE TELEPHONY PUBLISHING COMPANY
MONADNOCK BLOCK, CHICAGO 80 WALL STREET, NEW YORK

H. B. McMEAL, PRESIDENT W. H. GRAFFIS, VICE-PRESIDENT F. S. KENFIELD, VICE-PRESIDENT H. D. FARGO, SECRETARY AND TREASURER
H. B. McMEAL, Editor F. H. REED and R. H. HOLBROOK, Associate Editors J. C. KELSEY, Financial Editor
J. R. HASTIE, Asst. Advertising Mgr. W. H. GRAFFIS, Advertising Mgr. W. E. RAYMOND, Subscription Mgr.

Entered as second-class matter September 4, 1908, at the post office at Chicago, Ill., under act of March 3, 1897

Volume 61
Number 2

CHICAGO, SATURDAY, JULY 8, 1911

Subscription - 10 Cents a Copy
$3 a Year U. S., Cuba and Mexico
$4 Canada, $5 Other Countries

William Marion Reedy on Trusts.

In the current issue of *The Mirror* (St. Louis), William Marion Reedy, the editor, under the caption, "An Exploded Fallacy," has the following to say regarding trusts:

"Anyone who has read the testimony in the investigation of the steel and sugar trusts has discovered what a farce is the claim that the basic idea of the trust is that it shall effect economies in management and production in order that these may enable reduction in price to the consumer. The enormous fee exacted by Morgan for organizing the steel trust was not an economy. Nor was the $10,000,000 in stock that was given to Havemeyer for his happy thought of bringing sugar production under one control. The dismantling of plants in either case was not an economy but a waste. The issuing of bonds in vast amounts only put tremendous burdens upon the industry,—burdens the people have to bear in the long run.

Furthermore, it is shown in the testimony of Elbert H. Gary, that it is not the great trust that reduces prices. It is the little mills that are always cutting prices and keeping the trust magnates busy buying them out. The small producers are always ready to undersell Standard Oil, but Standard Oil meets this competition by giving away oil in the territory of the rival until that rival is driven out of business, and then the price goes up again to a figure that yields a profit even on what was given away.

"The economy of production excuse for trusts will no longer 'go'. The reduction of prices to the consumer is another fiction. The trust is organized solely for the benefit of its organizers. It charges all that the traffic will bear. It issues stock and bonds in excess of its property values, and the projectors get real money for them. There is no excuse for the trust."

Read in "telephone" instead of Standard Oil and steel and the truth of Mr. Reedy's conclusions is equally patent.

The Michigan Tax Cases.

Prior to 1901, Michigan telephone, telegraph and railroad companies were taxed specifically upon their earnings. In 1910, following political agitation on the subject, the legislature created a State Board of Assessors, giving them power to assess railroad property at its true cash value, ascertain the average rate of taxes throughout the state and then levy this average rate against the amount of the assessment.

In 1909, telephone and telegraph companies were made subject to the same act, but the law contained the following proviso: "Provided, that the property of telephone and telegraph companies whose gross receipts within this state for the year ending June 30, do not exceed $500, shall be exempt from taxation." Four Michigan telephone companies brought suit to restrain the enforcement of this law. The court took proofs which show that for the year ending June 30, 1909, 659 corporations and persons made the required report. Of these, 224 showed receipts of more than $500 each; 435 showed receipts of less than $500 each. The cost of the non-assessed property was about $200,000, and it all belonged to co-operative or Farmers' Mutual Associations, usually incorporated, conducted at estimated cost, and organized primarily to get them or their members cheap telephone service. It also appeared that there had been for some years a continuing absorption of smaller companies by larger ones, and frequently a co-operative, non-profit making company with a gross annual earning of less than $500, would sell its property to a larger company having a larger income.

The court held, (The Michigan Telephone Tax Cases, 185 F. 634), that the taxing act was valid, on the ground that the companies whose gross receipts did not exceed $500 formed a legitimate subject for classification, so that discrimination might legitimately be made in their favor by legislation.

The Bell-Trained Man As Independent Manager.

Some of the statements in the article on page 742 of the June 24 TELEPHONY struck home hard in the Independent field. As a whole, it seemed to ring so true to experience as to command careful attention. But among the comments received, the following, from H. N. Faris, of Kansas City, is here presented as capable of leading the way to further helpful lines of thought:

"Referring to the article in your issue of June 24th entitled

'The Telephone Game as One Independent Salesman Sees It,' I wish to take exception to a point or two which the writer has overlooked in his otherwise most excellent 'sizing-up' of a condition now present in so many communities.

"The article as written strikes me as objectionable insofar as it tends to establish the idea that telephone plants large enough to consider common battery equipment can be operated without the undivided attention of a competent manager. Competent management should be looked upon as the first requisite of any plant. If it is small enough to let the manager care for the switchboard work and superintend all new construction and maintenance, all well and good. But his ability as a business manager is of first importance, and many sales of Independent plants to the Bell company are, in my opinion, directly attributable to lack of competent management.

"But what strikes me as even more objectionable is the implied prejudice against the hiring of Bell employes by Independent companies. Many of the ablest Independent men of my acquaintance have at some time been employes of the Bell company. I do not believe that previous Bell training should be held against any applicant for an Independent job. I have seen hundreds of men outgrow prejudices in favor of Bell metehods and Bell equipment, while retaining whatever of such methods as possess any merit, and the man who has the nerve and the energy to break away from the Bell company frequently becomes a broad-minded 'winner' when he gets located where he can think for himself and put his ideas into practice.

"But of course when the Bell officials themselves pick out one of their men as the proper manager for an Independent company, it is time to beware, as no man should be employed by an Independent company who is not going to be loyal to his new employer's interests. The fact that an ex-Bell employe is at the outset favorable to Bell methods and Bell apparatus does not always indicate that the Bell company still has strings on him. Many good men enter the Independent field with such ideas, but actual experience with the best Independent apparatus and methods soon dispels all such false glamour, and the new recruit comes to think for himself and to recognize the good and reject the bad both in apparatus and methods.

"Good management should be encouraged. No prejudice should be held against the one-time Bell employe, but I do heartily agree with the writer that any Independent company so unwise as to let the Bell company get a hand in the running of its affairs can expect nothing but disaster; for, when the Bell companies cannot maintain and operate *their own plants* at a profit, how can they be expected to benefit Independent companies by their 'free advice,' even granting their intentions to be good and their methods honorable?"

How a Convert to Interconnection Was Made.

In conversation with an Independent telephone man recently, a representative of TELEPHONY was interested in learning that, within the previous four hours that gentleman had become converted to the doctrine of compulsory and general interconnection. For obvious reasons he prefers to remain anonymous. He is one of the stalwarts in the game, has been in it from the first and has never allowed his company to connect with Bell lines anywhere. Here is the story.

"I was in 'A' recently," said he, " and I wanted very much to discuss an important business matter with a man in "B," a distance of some 175 miles. The Independent company in "A" connected with the Bell long distance lines; the Independent in "B" did not. I called over the Bell long distance lines. The connection could not be completed because it did not connect at the terminal with the company which gave my man service. Then I was told I would have to use Bell lines throughout and pay for a messenger. I agreed. Then I waited—waited for hours. No result; my man could not be found. I suggested another roundabout way over other Independent lines. Nothing doing; the Bell did not connect with them. Finally I gave it up in despair.

"Here's the result: Neither the local company which originated the call, nor the Bell, with its long distance wires, nor the company which should have received the call, got any money for their labor. I wasted hours which might have been employed to some purpose, and ultimately had to go by train, at a considerable expenditure of time and money, to conclude my deal.

"So I'm for interconnection; I'm for that 'universal system' we hear of but have never known. And it took just this one practical experience of some four hours to make a convert of me."

There is the question in a nut-shell, as set forth by a man who knowns more about the telephone business in a minute than a great many will ever find out. We print it, without comment, for what it is worth.

Independents Win Missouri Connection Contract Case.

Victory for the Independents is the final outcome of the long-contested Missouri litigation over Independent exclusive connecting contracts for long distance service.

Just as TELEPHONY goes to press, a brief telegram is received giving the bare statement that a favorable decision has come down from the Supreme Court.

This litigation has been quietly but vigorously pushed by representatives of the Gary System for some five years. An unfavorable decision received some time ago in the lower court has now been reversed by the Supreme Court. The suit has been conducted in the name of the Home Telephone Co., of Joplin, but in the hearing before the Supreme Court the attorneys of the Kinloch company joined with those of the Gary System. A. F. Adams, engineer and assistant to the president of the Gary System, has been actively co-operating with the attorneys, and has supplied the practical and technical knowledge of the telephone business which served as a foundation for the legal arguments in the case.

The decision is probably of far-reaching importance, and is likely to materially change the complexion of the Missouri telephone situation. It may pave the way to the severing of many Bell lines from Independent boards. Full information will undoubtedly be available next week, when our readers may expect an ample review.

A HARD TEAM TO HANDLE

E. J. Nally, Vice-President of Postal Telegraph, Denies Sale of Texas Lines to Western Union.

E. J. Nally, vice-president and general manager of the Postal Telegraph-Cable Co., when questioned in regard to reports from Texas that the Postal Telegraph-Cable Co., of Texas, had sold its Texas telegraph lines to the Western Union, said:

"The regular Postal company, namely, the Mackay system, has not sold out its wires in Texas, Oklahoma and parts of Arkansas and Louisiana to the Western Union or the Bell company or anyone else.

On the contrary, the Mackay people have during the past few months built a line southward from Wichita, Kansas, clear across the state of Oklahoma and into Texas to Fort Worth and Dallas, and are now building rapidly to Houston and Galveston on the Gulf, and intend to cover all parts of Texas, Oklahoma and Arkansas as rapidly as lines can be built.

"What has taken place is this: For many years we have transacted telegraph business in Texas, Oklahoma and Arkansas by connecting with the Postal Telegraph-Cable Co. of Texas. This last company was, and still is, controlled by Bell interests. By reason of the fact that the Bell interests are now in control also of the Western Union, the Mackay people have started to build their own lines so as to conduct their own telegraph business in Texas, Oklahoma and Arkansas, instead of having it conducted by the Bell company; namely, the Postal Telegraph-Cable Co. of Texas.

"This last named company, the Texas Postal, is now retaliating by turning over its east-bound telegraph business to the Western Union at Memphis and New Orleans and other points instead of turning it over to The Mackay Companies as heretofore. This means that at points in Texas, Oklahoma and Arkansas not already reached by the Mackay lines the public will have their eastbound telegrams sent over the Western Union wires, no matter what company they give their telegrams to.

"In other words, if they hand their telegrams to the Postal Telegraph-Cable Co. of Texas, the latter will turn them over to the Western Union for transmission to the East instead of turning them over to the Postal controlled by the Mackay interests."

To Continue Probe of Bell of Cincinnati.

Investigation by the grand jury into rumors that free telephone service is being given to certain public officials and politicians of Cincinnati will now be again taken up. A subpoena has been issued for the appearance of Bayard Kilgour, vice-president and general manager of the Cincinnati & Suburban Bell Telephone Co. Kilgour recently returned from Europe. The probe of the January grand jury was interrupted by a summons of Kilgour to go to his father, who was critically ill in Florida.

Michigan Association to Discuss Merger Bill.

An informal meeting of members of the Michigan Independent Telephone Association will be held at Grand Rapids on Monday, July 10. The meeting is called for the express purpose of discussing the Giles law, which was recently enacted by the Michigan Legislature, and which permits the merger, sale or lease of telephone companies. The law becomes effective on August 21.

Three Long Island Companies to Consolidate.

Three Long Island Independents, the North Shore Telephone Co., the Baiting Hollow & Roanoke Telephone Co, and the Suffolk County Telephone Co., all located in Suffolk county, are planning to merge their interests.

Telephony's Volume 60 Index.

TELEPHONY's index of volume 60 is off the press and a copy will be mailed to any subscriber asking for it. It covers the issues of this paper from January to June 30, 1911.

Kansas City Telephone Users Do Not Favor Merging of Two Companies in That City.

The settlement of the local telephone question by a merger of the companies in Kansas City is not now regarded as probable. The members of the council and the Utilities Commission have about reached the conclusion that the people do not favor the move.

When the matter was first proposed, Clyde Taylor, counsel for the commission, purposed asking each telephone subscriber whether he favored consolidation. That was never done in any formal way, but the opinions of several hundred have been expressed and the general tenor was unfavorable to any merger ordinance that would increase rates. The strongest protest came from those who use two telephones, and figure that they would use two, even if the city had only one system.

The Bell company suggested that it would make the rate $78 for one telephone, but where the same subscriber paid for two, the rate would be $78 for the first and $50 for the second. That suggestion has not been acted upon and the commission is inclined to finally drop consideration of the telephone merger.

Telephone Companies at Grand Rapids, Michigan, Will Not Merge Under Recently Enacted Giles Law.

There has been a widespread belief in Grand Rapids that, under the provisions of the recently enacted Giles law, the two telephone companies in that city would merge. This has now been definitely refuted by a flat denial from the operating heads of both corporations.

E. B. Fisher, secretary of the Citizens Independent, has declared that his concern contemplates no move whatever of this nature. Further than that, he said that, in his opinion, any arrangement which would result in a monopoly in the telephone business in the state, destroying all competition, would be impossible under the law. In support of this contention he called attention to the fact that telephones were under the supervision of the Interstate Commerce Commission, and subject to the control of that body. He also pointed to the recent decisions affecting the tobacco trust and Standard Oil as showing that such mergers would be illegal under the Sherman act.

C. E. Wilde, of the Michigan Bell, disclaimed any knowledge of a proposed merger and said that no consideration had been given the company's actions under the operations of the Giles law.

Moline Commissioner Charges that Central Union Bell Company is Giving "Abominable Service."

Charges that service furnished by Central Union (Bell) Telephone Co. is abominable and that in every maneuver the company has attempted to place a stigma for this condition on city officials have been made by Commissioner Anderson in a communication addressed to the City Council.

The commissioner also sets forth that the corporation represents that the poor service between Rock Island, Davenport and Moline is due to insufficient trunk lines, a condition also laid on the shoulders of the city officials, apparently for the purpose of brow-beating the city authorities into yielding to the demands of the company.

The commissioner recommended that the ordinance submitted to the old council on or about March 9, 1910, be rejected and that officials of the company be invited to meet with the council in an effort to reach a settlement.

Napoleon Home Plant Sold.

The plant and franchise of the Napoleon Home Telephone Co., of Napoleon, Ohio, including several subsidiary plants in Henry county, have been sold by Special Master Commissioner Ralph P. Brown, of Toledo, to W. L. Parmenter, of the Lima law firm of Cable & Parmenter, for $21,100. The plant was appraised at $38,542.

Funny Finance

Some Sugar Humor—Some Doubtful Philanthropy—$50,000,000 Bell Stock Issue—The French Bourse

By J. C. Kelsey

What's in a name?

Is it worth $10,000,000?

Would you take that much money for the use of yours?

Does the name of Henry Havemeyer sound like $10,000,000?

No!

Well, it may not sound like it,—but when the departed Henry founded the sugar trust, he very sweetly appropriated $10,000,000 of the common stock for his name.

Henry left a son. His name is Horace.

Horace has some home-grown economic theories. Born in a hot-house—raised in luxury—all cake and no bread.

He has some good ones.

We learn from Horace that the organization of the sugar trust was an act of philanthropy.

What is philanthropy. What does it mean?

It came from Greece, long, long ago.

It means, literally speaking, "Man Loving!"

That proves the boy's contention.

Henry Havemeyer loved himself.

And giving himself $10,000,000 of common stock, should prove to anybody's satisfaction that Henry was quite philanthropic (to himself.)

You wonder what this has to do with finance.

It has a great deal to do with it!

Horace, the son, says the sugar trust was a fine thing for the consumer.

Sure!

We used to get twenty-four pounds of sugar for a dollar.

When the trust started out on its philanthropic mission, the public got twelve pounds for a dollar.

Maybe the secret of this consumers' benefit is that too much sugar is not good for the kidneys.

They work in devious ways, and poor human beings, working ten hours a day, have no time to understand the higher law.

Horace has another hot-bed theory: "Why don't they eat cake," said the princess.

"It is much better for large concerns to crush out small concerns and save them from bankruptcy."

If I saw you gambling, I could shoot you to save your soul!

That is a comforting thought.

When our small concerns are being swallowed up or ruined, it is a comfort to know that the big fellow is saving our financial souls!

Another economic beauty of the son of Havemeyer is: "Combination is better than competition between a large company and a number of small ones with limited capital and limited technical knowledge."

Why?

The small steel companies are punishing the big steel trust. In other words—combination is much safer for the big fellow with unlimited capital and all the technical knowledge.

How familiar this dope sounds to telephone men!

Anyway, the only difficulty that a small sugar refiner had in the past was his limited capital in bribing men to cheat the Government on short weight.

Philanthropy with a big "P."

It means killing off competition in oil and finding a remedy for hook-worm.

It means killing men at Homestead and giving libraries.

It means the destruction of the hopes of a group of minority stockholders, and a new art gallery.

There may be a new economic school organized by Rockefeller, Havemeyer and Co., but it is showing its fangs today.

Business is very quiet and there is no excuse for it. People have quit buying securities.

Apparently they have quit buying American Telephone.

With a skilled hand feeding it to Wall Street and Boston maidens, the process has been too slow.

Today with stock at 150, they are passing out new stock at par to stockholders.

That is a nice thing for the parent stockholders, but it adds a new burden to the licensees.

$50,000,000 at 8 per cent. is $4,000,000—some more squeezing!

It takes money to buy out competitors and then scrap the plant.

It is sordid vanity to spend money on a monopolistic idea, because all the brute force of money can not accomplish the purpose.

Bell telephone stock has been listed on the Paris stock exchange.

This place, from which no investor escapes alive, is called "The Bourse."

When the stock was listed, it stood at 152 in America. Before the poor French suckers could pull the money out of their pockets, the $50,000,000 stock deal was pulled off.

Accordingly, the stock exchange officials canceled all deals.

The French have had a pretty rotten experience with Funny Finance.

From the time they took $50,000,000 of Pennsylvania Railroad bonds, they have been double-crossed.

After they bought the securities of the Pennsylvania, the dividend was cut 1 per cent. And nearly every American security had been handled apparently by rough-riders.

It seems as if the entire financial world is trying to kill the golden geese.

Some day they will succeed.

That Bell stock issue of $50,000,000 is only another nail in the universal coffin.

The A. T. & T. Co. will have a capital stock of $313,335,000.

They claim $700,000,000 worth of property, but it is mostly in the name of licensee companies.

Bell can keep on paying 8 per cent. on $313,335,000 for some time to come.

They have other liabilities, too. Something like $150,000,000. Then think of the licensee companies whose stock and bonds add to this list.

There is Western Telephone, which does not pay its full

preferred dividend on $16,000,000, and which does not pay anything on the $16,000,000 common.

And there is Missouri & Kansas with $25,000,000, which pays no dividends. And poor old Central Union, running close to $25,000,000, and which will never pay any dividends.

The millions in the Canadian Bell; the New York Telephone; the Southern Bell; the Rocky Mountain and Pacific Bell, and others.

In all these properties, the millions run high. But where are the dividends? And echo answers "Where?"

But they are under no obligations to pay licensee dividends.

A holding company is a financial crime! Minority stockholders in holding companies either get scanty dividends, grudgingly squandered on them, or nothing at all.

If the American Bell is not a holding company, what is it?

It got 30 per cent. or more of the stock in every licensee company for nothing. It charged like blazes for everything as long as local influences controlled. Now that nearly all local interests are weeded out, prices go down.

When the manufacturing contract of the Western Electric Co. expired, that concern made little money.

The blighting hand of a holding company never fails.

But it is "philanthropy"—pure and simple.

Oil is philanthropy. The beef trust is philanthropic—"Man-Loving," all of them!

None but a big concern can live, because they have more money and more technical knowledge.

That is a mistake. A large company has one-third of its employes standing in the way of the others, or has one-third of its force spying on and inspecting the rest.

Outside of Standard Oil, no trust ever reduced the price to the public. But the Standard Oil Co. made so much profit that it was ashamed of it.

Horace Havemeyer and other sons of philanthropic magnates will yet get their feet wet.

Shirt-sleeves may yet be popular to the tribe that has accumulated such funny economic ideas.

Horace's name will not be worth $10,000,000. And I will bet that 1950 will find the crowd with changed ideas.

Wealth is all right. We all would like to have it.

But when such as Horace would inflict themselves upon us by taking our small plants away from us, we have to fight.

Large plants lead to swollen fortunes and then to dukes. Dukes are handy references when papa wants to finance anything.

Civilization has not been much kinder to women than our old savagery.

All hail, Horace and his views!

All hail, the mighty arm of the American Bell! May he yet be Governor of Vermont!

All hail, Carnegie and his $25,000,000 a year! Andy's employes earn $550 a year.

But do you want a library?

An American woman had the most diamonds at the coronation.

Hurrah! We may well be proud of our new economics!

The Bell company believes in Horace Havemeyer's statements. The Bell believes in gobbling up everything, even when it knows that a monopoly requires $50 to $80 a telephone to get along and cover up its inefficiency and extravagance.

That $50,000,000 will not be the last call. Chicago Telephone has $10,000,000 more of bonds. New York Telephone can place $25,000,000 more.

But the jewelry is fast going into the public pawn shop.

That $50,000,000 is in no sense a Bell melon. It is a sacrifice. It is the only way out!

I will tell you the secret of funny finance. It is in the MORAL: Select your father!

Bell, Having Killed Competition in Racine, Replaces Modern Party Line with Antiquated Device.

The Wisconsin (Bell) Telephone Co. is installing in Racine the code system of party lines which requires the ringing of every bell on the line whenever any subscriber is called. This action of supplanting the selective ringing with code ringing, particularly in a city the size of Racine, is meeting with violent opposition.

The *News* devotes nearly a column to a discussion of the scheme, and is bitter in its comments. It says, in part:

> Such a system as the Wisconsin Telephone Co. is now installing is in use on the rural telephone lines. It has been declared a nuisance wherever tried and will be a most rank nuisance to the telephone users in Racine. The quicker it is dispensed with the better it will be for all. The Wisconsin Telephone Co., when it absorbed the Citizens' Telephone Co., announced that it would give to all patrons in the city the best and most modern system of telephone service. When this is to be done, if ever, can only be told by the officers of the company. The start has not been as expected and no one knows what the finish will be.
>
> So, you user of a telephone, if you are on a party line and are awakened at 2 or 3 o'clock in the morning by the ringing of the telephone bell, do not leap from your bed to answer the call unless you are certain that you are wanted. Just remain in bed and await and see whether one, two, three or four rings are given and then you will know whether you are wanted. The loss of sleep to you is but a minor matter to the Wisconsin Telephone Co.

Particular attention should be given the statement that *"the Wisconsin Telephone Co., when it absorbed the Citizens Telephone Co., announced that it would give * * * the most modern system of telephone service."*

Racine, it will be recalled, was one of the points at which competition was wiped out by the Bell company. The outcome is precisely what was expected by those familiar with results in other towns in which competition has been abolished. It is believed that the matter will be brought to the attention of the Railroad Commission.

To Value Nebraska Telephone Properties.

Steps are being taken by the physical valuation department of the Nebraska Railway Commission, in charge of E. C. Hurd, chief engineer, to appraise all telephone, telegraph and express companies and electric railway systems in the state. This will be done under authority of appropriations made by the last Legislature for each specific purpose. It will be the first time a valuation of the properties mentioned has ever been undertaken in Nebraska by public agency.

Conferences regarding the forms of schedules to be used in telephone properties have been held by Mr. Hurd with L. E. Hurtz, manager of the Lincoln Telephone & Telegraph Co., and Mr. Rogers, engineer for the Nebraska Telephone Co. There are 300 or more telephone companies in the state, all of whom will be asked to report their holdings in detail.

Stromberg-Carlson Dividend Paid.

The Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., has paid a dividend of 1¾ per cent on the $1,500,000 preferred stock of the company. The distribution applied on payments which have been deferred and will bring dividend payments up to July 1, 1907.

Independents Far Ahead of Bell Around Pittsburgh

Editor of Carnegie Union, Probing Into Conditions in That Field, Following Endorsement of P. & A. Independent, Finds He Has Wrong Conception of Situation—Discovers That Bell Does Not Control Bulk of Business, as Claimed—Some Interesting Conclusions

TELEPHONY reported some time ago the uncompromising attitude assumed by the Central District & Printing Telegraph (Bell) Co. in its redistricting of Pittsburgh and the adjoining suburbs, and the reception accorded the plans, which included increased rates in many instances. The editor of the Carnegie *Union* has recently taken steps to ascertain just what warrant existed for the almost universal endorsement which was at that time given the Pittsburgh & Allegheny (Independent) Telephone Co. by the citizens of these suburbs. His conclusions are printed in full below. They are typical of the conclusions usually reached by those who have never previously investigated the situation, and who have imagined that the Bell companies really did, as they claimed, control the bulk of the telephone business.

"Since the would be monopoly telephone company saw fit to cut Carnegie and vicinity off the map, except as her citizens might choose to accept such service and terms as that concern proposed," says the *Union*, "we have taken the time and trouble to look up the telephone situation in general, not only throughout the Pittsburgh district, but the adjacent territory which would be likely to interest our citizens. We have done this for the purpose of determining in our own minds just how far this supposed monopoly telephone company really has existence, and what opportunities the people yet have at their command for protection. In doing so we have met with some very interesting surprises.

"We believe that our people in general have been led to think that the P. & A. Telephone Co. and its connecting companies were of but trifling importance; that their long distance service was of small account; that to reach surrounding cities we must necessarily use the Bell service; that the cities and towns around Pittsburgh had little or no P. & A. service; that the Bell company had or was about to buy up all Independent companies, etc.

"In our first surprise we found that the business houses of the city of Pittburgh very generally have and use the P. & A. service, and that it is generally as good and oftentimes better than the Bell service.

"Second, we found practically all of the smaller cities and towns in the immediate vicinity of Pittsburgh using the P. & A. service, some of which (McKeesport for instance) have far more telephone subscribers than the Bell company.

"Third, we find just outside the Pittsburgh district in practically all of the larger cities, towns and rural districts, the Independent subscribers outnumber the Bell subscribers, in some instances ten to one. For instance, Johnstown, Pa., maintains and operates an Independent telephone plant, and is furnishing the very best of service to 6,000 subscribers, all directly connected with the P. & A. company by well equipped long distance lines, while the Bell company is giving service, in the same territory, to not more than 500 or 600.

"Somerset county, Pa., furnishes Independent service to more than 1,500, while the Bell company has between 400 and 600 in the same territory.

"Butler county, Pa., is giving Independent service to 5,500 subscribers, while the Bell telephone company furnishes service for about 1,500 in the same territory.

"Shenango county, Pa., is giving Independent service to 4,991 subscribers, while the Bell company has about 875 in the same territory.

"Beaver county, Pa., has a fine new plant put in service about two years ago, built by S. C. Thayer, who now has charge of the Carnegie district. This Independent plant, although new and in service but a short time, is outnumbering the Bell list in several of its towns. We had the pleasure of visiting this plant in company with Manager Thayer on Friday, June 23, and found it to be in our judgment a strictly up-to-date telephone plant, operated in harmony with, and directly connected by, P. & A. long distance lines. It was here that we began to realize that we had been led to misjudge what was about us in the way of Independent telephone service.

"Columbiana county, Ohio, enjoys complete Independent telephone service, not only in its several larger cities and towns, but, like Armstrong, Butler, Somerset, Lawrence, Beaver and other counties in Pennsylvania, it is thoroughly equipped with Independent rural telephone service.

"Trumbull county, Ohio, is also one of our nearby counties thoroughly equipped with Independent telephones. The city of Warren, the county seat of Trumbull county, Ohio, has over 2,200 Independent telephones directly connected by P. & A. long distance lines, while the Bell company has in the same district between 500 and 600.

"We were further somewhat surprised to learn that we can sit at a P. & A. telephone here in Carnegie and converse, by Independent long distance lines, with Cleveland, Ohio; Erie, Pa.; Buffalo, N. Y.; Rochester, N. Y.; Toledo, Ohio; Columbus, Ohio; Detroit, Mich.; St. Louis, Mo., and a thousand and one other points throughout the United States which we had been led to believe could only be reached by the Bell telephone.

"With all the above reliable information we do not feel so dependent upon the would-be dictator of terms as we might have thought, and the people of Carnegie and the Pittsburgh district in general are wise in their general move to support the Pittsburgh & Allegheny company's service."

Utah Development League Appoints Special Committee to Consider Telephone Situation in State.

The Utah Development League now has before it the telephone situation of the state and has appointed a special committee to investigate both the impending increase in rates of the Bell company and the inauguration of an Independent system, as proposed by the Hammer syndicate. The committee is composed of: George J. Kelly, Ogden; George Havercamp, Provo; George B. Greenwood, Milford; George E. Merrill, Salt Lake, and C. R. Mabey, Bountiful. It will investigate conditions thoroughly and will report as soon as possible to the board of governors of the league.

In a letter read at the meeting, which was held at the Commercial Club, in Salt Lake City, E. W. Hammer set forth the merits of the operation of a real Independent company throughout the state, which he declared to be the only solution of the telephone problem. He said that Independent companies to the north in Montana, Wyoming and Idaho are ready to meet the people of Utah halfway in establishing an Independent system of the intermountain states mentioned.

Mr. Hammer's contention is that a company financed by people in Utah, maintained and managed exclusively by Utah citizens, will not only be a benefit to the people in the way of offering better service, but it will help keep the profits of the telephone industry within the bounds of the state. On this subject he said: "All of the profits may remain in Utah if this Develop-

ment League wills it so and resolves to lend its prestige and support to the consummation of that object."

Among other things to which Mr. Hammer declared the people of Utah are entitled, and which he mentioned in his letter, were:

"Long-distance connection with the Independent automatic system of Montana, where the Independent system is paramount throughout the state. The Montana company stands ready and anxious to meet us halfway, and Utah business men need this widening of their business horizon.

"Long-distance connection with her sister states on the coast and to the south, all of which are to be had, but never will be realized under Bell domination.

"The rapid extension of the Independent toll lines to the more distant parts of the state, thereby bringing into close touch with our business men those who, by their greater distance from the centers of population, stand most in need of such service.

"A maximum business rate for Salt Lake City of $60, minimum $48, a maximum residence rate for Salt Lake City of $30, minimum $18, with proportionately reasonable rates for other localities.

"In general, they need and should enjoy a toning up and the modernizing of their telephone service, a more equitable adjustment of toll rates, more attention to the special needs of different localities and that greater consideration and courtesy which only competition secures in any line of business. In short, they should have a Utah telephone company, of the people, by the people, and for the people."

The league, which represents the commercial clubs of the cities of Utah, is an exceedingly influential body. It is not doubted by those in touch with affairs that it will support the establishment of real competition, which Utah has not known for years.

Ohio Railroad Commission Reorganizes as Public Service Commission—May Open Cincinnati.

On July 1 the railroad commission of Ohio went out of existence and in its place there arose the Public Service Commission of Ohio, due to the fact that the new law relating to the control of public utilities has gone into effect. Under its terms the new duties imposed have devolved upon the three members of the Railroad Commission: O. P. Gothlin, of Dayton; Oliver H. Hughes, of Hillsboro; and John C. Sullivan, of Hamilton.

Mr. Gothlin, who was president of the old board, will remain in that position until the expiration of his term.

No appointments were made by the commission. The members have made visits to Albany, N. Y., and to Madison, Wis., to examine the workings of the commissions of those states and have, in a degree, mapped out their course of action.

Experts will be placed at the heads of the various bureaus to be created to handle the various forms of public service and engineers and accountants will be employed to survey and examine properties. The commission is forced to move slowly because of the dispute over the amount of money to which it is entitled. The state allowed it $75,000, and a like amount is to be raised by assessment upon the public service companies. It is not known when this will be available.

One of the first pieces of business expected is the determination of the right of the Home (Independent) Telephone Co., of Hamilton, to force long distance service into Cincinnati over the Bell lines.

Would Oust Bell at Denison, Texas.

The City Council of Denison, Texas, has ordered ouster proceedings commenced against the Southwestern (Bell) Telephone & Telegraph Co. It is stated that the company's franchise in Denison expired over a year ago.

Manner of Computing Value of a Telephone "Right" as Outlined by Eastern Financial Writer.

Many people have not clearly understood the way in which the "rights" to a new stock issue are computed. They read about speculation in "rights," as in the case of the new securities just authorized by the A. T. & T. company, but they do not know how the value of a "right" is figured. A financial writer in the Boston *Globe* has analyzed the process, as follows:

There are various ways of computing the value of a right on the new issue of American Telephone stock. Because the payment is spread over a period of fourteen months, the calculation is somewhat complicated.

One method of figuring the value is here shown. This calculation proceeds from the supposition that a present shareholder sells his stock and replaces by buying rights in the market, making full payment for his stock Nov. 1, 1911. For convenience an even lot of 100 shares is taken.

The figures work out as follows:

Debits:		
500 rights at $7		$ 3,500
Commission		25
Loss of div. on 100 shares, July and Oct., 1911; Jan., April and July, 1912		1,000
Loss of 100 rights on stock sold at 7, less commission		695
Subscription payment in full Nov. 1, 1911		10,000
Total		15,220
Credits:		
100 shares at 147⅝, less commission		14,750
Interest on payments at 8 per cent.—		
$2,500 Nov. 1 to Dec. 31	$33.33	
$2,500 Dec. 31 to March 31	50.00	
$2,500 Feb. 1 to March 31	33.33	
$5,000 March 31 to June 30	100.00	
$2,500 May 1 to June 30	33.34	250
Interest at 4 per cent. on prepayments—		
Nov. 1 to Feb. 1, $2,500, 3 mos.	$25.00	
Nov. 1 to May 1, $2,500, 6 mos.	50.00	
Nov. 1 to Aug. 1, $2,500, 9 mos.	75.00	150
Interest on balance of proceeds stock after deducting cost of rights at 2 per cent.		75
Total		15,225

With a difference of but $5 between the debits and credits it is fair to assume that rights at $7 are for all practical purposes the equivalent of stock at 147⅝.

Each one-eighth on rights adds ¾ point to cost of stock.

The following table gives such comparative figures with rights taken at quarter-point fluctuations from 6¼ to 7½:

Stock at		Rights at
150⅝	equivalent to	7½
149⅛	equivalent to	7¼
147⅝	equivalent to	7
146⅛	equivalent to	6¾
144⅝	equivalent to	6½
143⅛	equivalent to	6¼

A. T. & T. Lists Additional Stock.

The American (Bell) Telephone & Telegraph Co. has listed on the Philadelphia Stock Exchange $309,100 additional capital stock. This was issued in exchange for $415,000 of the 4 per cent. convertible bonds of the company. The total stock now listed is $274,818,200. The convertible bonds outstanding now aggregate, it is stated, $23,560,000.

Interconnection Law in Effect in Maine.

In Maine a law has just gone into effect compelling all telephone companies to interchange service with other companies in adjoining territory. It is understood that the New England (Bell) Telephone & Telegraph Co. is preparing to test the constitutionality of the statute.

The Manufacture of Fir Crossarms

Interesting Discussion of the Requirements of Crossarms in General and of the Methods Employed in Producing Those of Washington Fir—One Mighty Relic of the Forest, Shown to Be Over 1,000 Years Old, Found to Contain Sound Timber Fit for Present Use

By A. F. Crosby*

Crossarms must be hard as iron, yet metal will not answer the purpose. They must be durable as granite, have the tensile strength of steel, and be able to withstand the corrosive action of weather conditions and the strain of storm, sleet, wind and water, to say nothing of the constant pull of tons of wire stretched tightly, and in constant vibration. Crossarms must be practically "clear" (free from knots that would weaken their power to resist strain); straight-grained; of material that is hard, elastic and durable, and they must be of perfect manufacture or they will give way at a time when their services are most needed.

The manufacture of crossarms is a business in itself, for which experts of long experience are required, and in which vast amounts of money are invested every year. It is estimated that something over three and one-half million crossarms are purchased annually, amounting to about forty million feet, board measure, of lumber. Of this amount about 55 per cent. comes from Pacific Coast forests, about 15 per cent. from Southern Atlantic states, 20 per cent. from the yellow pine forests of the Gulf states, and 10 per cent. from the fast receding Michigan and northern lumber camps.

More than one-half of the entire output goes to the telephone and telegraph companies of the country, nearly one-third to electric railroads, light companies and power plants, and the balance to steam railroads.

Nothing but the very best of material and highest skilled workmanship must go into a crossarm. For this reason, perhaps, their manufacture is confined to a very few large concerns, which, from long experience, thoroughly understand what is required.

From time to time experiments have been made in the past fifty years at considerable expense to institute the use of iron or other metal for crossarms, but so far without success. The electric current will short circuit on the slightest provocation, and a metal crossarm is too much of a temptation.

Fir is a hard, tough wood, very straight-grained and very close-grained. The trees grow to from 300 to 400 feet in height (sometimes to 500 feet) and from 200 to 250 feet before branching. Hence the lumber runs largely to "clear" free from any large knots, a condition very essential in crossarms.

Fir has a great tensile strength far more than doubly sufficient by actual test to stand all the special strain to which crossarms are subject. The closeness of the grain prevents dampness getting into the pores of the wood and starting decay, and there is no excess of natural sap to effervesce and lead to dry rot or to exude under the rays of a hot sun, leaving the wood porous and weak.

As a matter of fact, there seems to be practically no

*Mr. Crosby is sales manager of the American Crossarm Co., of Chicago.

A Fallen Monarch—Giant Fir Tree in Washington Forest.

limit to the length of time fir will remain stout and strong even under the most adverse conditions, as possibly the following will show.

Scattered through the forests of Washington are gigantic trees that fell ages ago and have been buried in moss and decaying vegetation for generations. The moss upon these fallen monarchs has provided a bed for the seeds of other trees, and those seeds have sprouted, taken root and grown, and covered the fallen trunks with their roots. Such an instance was found not long ago in a Washington forest, where the tree which had originally fallen had 320 rings, and the tree which had grown over it and covered the old trunk was found, when cut down, to have 740 rings. If it is a fact that every ring denotes a year's growth, then the first tree had fallen and cased growing 325 years before America was discovered. It was lying covered with moss at the time that Richard I, Coeur de Lion, was knocking at the gates of Acre, centuries before the burning of Joan of Arc or the death of William Tell, yet *the lumber in this old tree was sound* and was cut up into boards and shingles, a sample of which is on exhibition in our Chicago office today.

Of course, no company could give a written guarantee that its fir crossarms will last for over 700 years, but with the foregoing in mind it looks as though such a proceeding might possibly be justified.

The records of the Forestry Service do not trace this Washington fir back of its growth on the western coast of the American continent, but from its similarity of growth, fibre, strength and durability of its timber, shape and general nature of the growing tree, there is very strong reason to believe that the Washington fir is closely related to, if not the direct descendant of, the Cedar of Lebanon, of which King Solomon made use in the building of the temple of Jerusalem.

It is perhaps a descent in more than one sense of the word for this monarch of the forest, from being used for the decorative ceiling work and vast trusses of one of the most magnificent buildings ever erected, to become simply a support for the stringing of wires. Yet who shall say that, in thus entering into and becoming a part of an intricate system whereby is evolved a means of intercommunication in all parts of the world, overcoming the limitations of time and space, and bringing the tribes and nations into accord and intimate knowledge of each other—who shall say that the fir of America is not fulfilling as noble a destiny as its ancestor, the cedar of Lebanon?

But it is not only in the proper selection of material, nor even in the quality of the material, that special attention must be given to the manufacture of crossarms. Many a lumber manufacturer has exhausted his finances in the endeavor to establish a crossarm business, before he has learned that, after the log has passed through the saw mill and the lumber has been cut to proper dimensions, there is from 25 to 30 per cent. waste in the cutting of crossarms from that lumber. Imperfections must come out; checks, knots, "pitch pockets," cross-grained patches, all these must be cut away; and from what is left the crossarms must be cut to exact size and length. A piece nine feet eleven and one-half inches will not do for a ten-foot arm, but must be cut down to the next length, eight feet, and that means over two feet of lumber lost.

Again, if, when the lumber is going through the saw mill, the big saw should slip and cut the pieces just the merest trifle "scant" (as quite often happens), it must be thrown aside, for no cross-arms under size will be accepted for use. After being cut to dimensions and length, the arms must be planed on four sides, rounded or "chamfered" on the top, and bored with holes for wooden pins which hold the glass insulators on which the wire is strung. These holes must be exactly at right angles to the arm, and of exact size. If the least bit large, the pins will "wobble" and will be insecure, while, on the other hand, if the blade of the auger be a little dull, and the finish of the hole rough instead of smooth and clear, the

Hauling Washington Fir Logs to the Mill Where They Will Be Converted Into Crossarms.

pin will not go into the hole unless driven wtih a hammer, and this tends to split the arm right at the outset of its work.

Then there is the question of seasoning. Green lumber will not do for crossarms. Many a carload has been rejected at destination, because, although they left the mill straight and square, and apparently perfect, the material had not been thoroughly seasoned before being manufactured, and the heat of the close packing in the car had already caused the arms to "sweat" and twist and warp until they would hardly be recognized.

However, this test of examination upon arrival at destination is but the first of a series to which the crossarm must be put during its entire life. Every good telephone or telegraph line is kept under constant surveillance day by day, repairs made, defective parts replaced and the line kept in perfect order, and if any of the crossarms show evidence of dry rot or other weakness, they are at once replaced. Some crossarms are supposed to last from five to six years, and others thirty years or longer, so that if, by reason of lack of proper seasoning, or other defect in manufacture, a line of crossarms is found to be weakening before their proper time, a heavy expense is entailed for their replacement.

This caution is absolutely necessary, for one weak crossarm giving away, especially during a heavy wind or sleet storm, is liable to carry the whole line with it, sometimes for a long distance. Or if it should break while one of the linemen was sitting on it, repairing or replacing the wires, the company might incur a heavy damage suit. Hence the necessity for the manufacturer, in his own interest, to take every possible precaution to have the crossarms perfect before they leave the factory.

Conductivity and Temperature Coefficient of Copper Discussed in Bulletin of Bureau of Standards.

Volume 7, No.1 of the Bulletin of the Bureau of Standards, conducted by the U. S. Government at Washington, under the direction of S. W. Stratton, contains the following articles of interest to telephone engineers:

"The Temperature Coefficient of Resistance of Copper."

"The Electrical Conductivity of Commercial Copper."

The article on the Temperature Coefficient of Copper mentions the widely varying values now in use, as determined by various prominent investigators in America and abroad. Concerning these values the Bulletin says:

"Widely varying values are in use for the temperature coefficient of resistance of copper. Some of those which have been much used are given in the following table, in which α_0 and α_{20} are given respectively by the equations. $Rt = R_0 (1 + \alpha_0 t)$ $Rt = R_{20} [+ \alpha_{20} (t - 20)]$ R_0, R_{20}, Rt=resistance respectively at 0° C., at 20° C., and at t°, t = any temperature centigrade.

	α	α
Matthiessen's temperature coefficient, 0° to 20° C.	0.00398	0.00369
Laboratorie Central d' Elecvtricite	.00400	.00370
Kennelly and Fessenden, 1890	.00406	.00375
American Institute of Electrical Engineers	.00420	.00387
Verband Deutscher Elektrotechniker	.00426	.00392
(British) Institution of Electrical Engineers	.00428	.00394
Lagarde, 1893	.00445	.00409

Matthiessen's formula is $\lambda_t = \lambda_0 (1 - 0.0038701\ t + 0.000009009\ t^2)$. λ_t and λ_0 = conductivity, or reciprocal of resistance, at t° and 0° C., respectively.

The variations of the values in the above table may be considered to be due either to errors of the measurements made in establishing them or to differences in the temperature coefficients of different samples of copper. In either case, accurate results can not be expected when one of these values is taken as fixed and used for all samples. That this fact is not recognized is shown by the common practice of assuming that the temperature coefficient is the same for different samples of copper, while the conductivity is usually measured It was accordingly considered of importance to determine whether the temperature coefficient of different samples does vary, and also to find whether there is any simple relation between the conductivity and the temperature coefficient.

"An investigation has been carried out with the above in view upon samples of copper which represent a considerable number of the chief sources of supply of the copper used for electrical purposes, and which include the native metal, that refined by smelting, and that refined by electrolysis. The results show that there are variations of the temperature coefficient, and that to a fair accuracy the relation of conductivity to temperature coefficient is a simple proportionality. This relation is in corroboration of the results of Matthiessen and others for differences in conductivity caused by chemical differences in samples; but the present results show that it holds for both physical and chemical differences. Thus, hard-drawing and annealing, even more exactly than changes in chemical composition, cause proportional changes in conductivity and temperature coefficient."

The paper describes the investigations in detail, and presents as a conclusion the following practical rules:

"The 20 C temperature coefficient of a sample of copper is given by multiplying the number expressing the percent conductivity by 0.00394."

"The change of resistivity per degree C of a sample of copper is 0.000598 ohm per meter-gram, or 0.000681 microohm per centimeter cube."

The paper on "Electrical Conductivity of Copper" says:

The resistivities are given for 89 samples of commercial copper from 14 important refiners and wire manufacturers in this and other countries. The mean for annealed wires is:

Resistivity in ohms per meter gram at 20° C = 0.15292
Per cent conductivity..... = 100.07%

(Per cent. conductivity is computed on the basis of 100% conductivity corresponding to the standard resistivity, 0.153022 ohm per meter-gram at 20° C.) The mean result of data furnished by a large wire manufacturing company, representing tests on more than 100,000,000 pounds of copper, is also given, viz., for annealed samples:

Resistivity in ohms per meter gram at 20° C = 0.15263
Per cent. conductivity..... = 100.25%

It is concluded that the best value to be assumed for the resistivity of annealed copper, in the preparation of wire tables, and in the expression of per cent. conductivity, etc., is the previously used standard, viz.,

0.153022 ohm per meter gram at 20° C.

The conductivity of hard-drawn No. 12 B. & S. wires was found to be less than the conductivity of annealed wires by a mean value of 2.7 per cent. The difference between the conductivity of annealed and hard-drawn wire increases as the diameter of the wire decreases.

The lowest resistivity and highest conductivity found, for a hard-drawn wire, were:

Resistivity in ohms per meter-gram at 20° C = 0.15386
Per cent. conductivity..... = 99.46%

and for annealed wire were:

Resistivity in ohms per meter-gram at 20° C = 0.15045
Per cent. conductivity..... = 101.71%

Representative mean values for commercial hard-drawn aluminum were obtained as follows:

Resistivity in ohms per meter-gram at 20° C = 0.0763
Resistivity in micro-ohms per cm. cube at 20° C = 2.828
Density ..... = 2.70

The desirability of an international standard of copper conductivity is urged.

What Competitive Operation Will Mean to Chicago

Discussion of Telephone Competition in General and Its Application to Conditions in the Second City in the United States—Will Bring an Influx of New Business Now Diverted to Other Cities—Stimulation of Telephone Construction Throughout Adjoining Field

By Harold D. Stroud

Competition as a general proposition rarely, if ever, assumes the nature of a burden upon the consumer. In her wise dispensations nature provided an agency for the automatic regulation of things pertaining to human welfare, and only where competition is needed can competition exist, or endure. This statement cannot be controverted by any course of logic. Unregulated monopoly—and I contend that no monopoly can be properly regulated under an unpaternal government—is the unnatural condition, and the one that works hardships upon the consumer class.

Take the telephone business as an instance. It came into being as a monopoly of the strongest kind, fostered and protected by the government patent system, which granted to the owner a seventeen-year unrestricted monopoly, and asked nothing in return.

It is a notable fact that the telephone remained an infant industry until the monopoly was broken by the expiration of the Berliner patent, which at that time formed the backbone of the telephone monopoly. The birth of the Independent telephone movement was marked by confiscation and persecution of the worst kind. Piles of telephones, better than owned by the monopoly, were material for bonfires in the streets, and small struggling companies were compelled to defend costly patent suits as far from home as the law would allow, in pursuance of what was thought to be a well engineered plan to forestall the movement, which it could be seen would grow rapidly when competition became possible.

What Followed Losing of Berliner Suit.

With the losing of the Berliner suit by the monopoly, Independent systems with toll lines and exchanges sprang up everywhere. The farmers, merchants, doctors and lawyers formed these companies and they were prompted to spend their time and money principally because of their own need of better telephone service than the monopoly had supplied, when they had supplied any at all. Hundreds of thousands of homes and business houses were denied the benefits of the world's greatest convenience, were forced to wait beside the track, so to speak, while the long, slow moving monopoly train dragged itself by.

Nearly every city, village, and country community now has an Independent telephone system, in the aggregate many times larger than owned by the opposition. Towns that once had but ten telephones under the old order of things now may brag of several thousand, and the farmer keeps his horses at work instead of using them to go to town for things that the telephone now brings to him.

Competition has forced the building up of long distance lines, which were not developed under the monopoly to any great extent. There was too much good, easy money in local telephones at $200 or more per year for telephones to waste time in stretching the investment over miles of country. Why, even if you wanted a telephone ten miles from the Chicago City Hall fifteen years ago you had to pay a bonus to build a line and then pay a high rate for service. You can now have a telephone there without a bonus, and at a much lower cost of service.

Competition, though not actually present in Chicago before 1911, has been a large influence in the bettering of telephone conditions, but it has been the experience the world over that competition has never produced its fullest benefits except when actually present.

Chicago has been one of the last citadels of the telephone monopoly to capitulate to the Independent army, although within her limits have been manufactured 85 per cent. of the millions of telephones that lighten mankind's burdens.

Movement Reborn with Opening of Chicago.

Chicago has always been the Mecca of the Independent telephone men, and those who yearly met here to discuss better ways of promoting the development of the telephone have, until 1911, looked in vain for an Independent telephone system. The fact that at the recent meeting of this large organization it could be definitely stated that Chicago actually had in operation an Independent telephone plant, and that a comprehensive system was being built to cover the entire city, and connect with the extensive network of Independent lines throughout the country, had an immediate and tremendous effect upon the movement.

These men went home from Chicago feeling that the Independent telephone movement had been reborn, and that now nothing could stop the ultimate development of the telephone industry and the expansion of the telephone as an institution so as to make the service universal in reality, because these men represent hundreds of millions of dollars in investment present and future. The fact that Chicago did not have an Independent telephone system had thrown a check on the entire movement.

This is why the opposition dreaded to see Chicago become the strong point for the Independents.

It does not require a seer or a wizard to show that this new era in telephone service will mean an influx of business to Chicago from all the country around. Thousands of express orders are placed with other cities, such as St. Louis, Indianapolis and Detroit, also minor jobbing points, because merchants in those towns all have the Independent telephone, and thousands own interests in them, while they do not even have the old telephone in their places.

One typical instance is sufficient to emphasize this point. The little city of Lafayette, Indiana, in which the writer lives, has about 3,000 Independent telephones. The company is in a prosperous condition and is connected with every other city and town in the states of Indiana and Illinois. The opposition company has about 200 telephones in the town, and many of these have been ordered out, until the people have given up in despair and have allowed them to remain to ornament their premises. This will not be found to be an exceptional case, as statistics will show, based on number of telephones operated by both companies in the Central States.

To participate in the benefits that competition will bring about will soon be the privilege of every Chicagoan, and thousands upon thousands of them are ordering automatic telephones installed faster than facilities can be provided.

Consumer Pays for Producer's Mistakes.

It is a well-known fact that the consumer ultimately foots the bills for the mistakes made by the producer, and for overcapitalization of properties, therefore a new telephone system built with the latest material and devices, having no overcapitalization, starting with a clean slate, buying its materials in the open market at the lowest figures, buying no bonus, royalties or licenses, has the best chance to serve the public at the lowest figure.

The new automatic telephone system in Chicago is entering upon its work under the most favorable auspices, and the en-

ergy that has been shown in the building of exchanges, conduits and distributing lines, enabling it to install nearly 30,000 telephones in a year from the day it started, under the most trying conditions, is a performance unparalleled in the history of the telephone business.

The question of dual telephone systems has often been presented to the public in such a way as to give the impression that it was an unmitigated nuisance, while the facts show exactly an opposite state of affairs. The only possible sufferers, if any are to suffer, would be the small users of the service, who find one telephone a burden under the present rates, where they must pay five cents per call, but there is no better evidence of the fact that this class do not fear competition, than that offered by the thousands of contracts signed by the small users who represent a large percentage of the subscribers to the new service, many of them having no other telephone.

Those who can afford more than one telephone can divide the business and profit thereby. The increase of traffic on the automatic will gradually lighten the traffic burden of the opposition, and should improve the service. People who now pay $365 per year for one trunk line on a private switch board can have four unlimited trunk lines of the new company for the same money. These lines can be used for the heavy business, and the other lines left more free thereby.

Pay stations are being installed in public places without any guarantee, therefore representing no burden upon any one, in fact, a liberal division of the profits is being made to recompense the party upon whose premises the telephone is installed.

The only chance for an argument against dual telephone systems is on the grounds of a possible increase of fixed cost to the subscriber: A person paying $125 per year at present for an unlimited telephone can change to a limited service telephone and install an unlimited service automatic telephone, thereby having double-track service at an excess of about $1 per month over what he previously paid for one telephone.

This, instead of being a detriment, would be a step in the right direction for many small business houses think one telephone line should handle their entire business, when, as a matter of fact, this important entrance to their business houses, even more important than that created by the architect, is too often found obstructed, with the result that valuable business is turned away to seek competitors.

The objection to the presence of two instsruments in the home or office is based upon sentimental foundation only. There need be no confusion, as the bells can be entirely distinct and both telephones can be supported side by side on a desk bracket which can be pushed out of the way when not in use, and in the home one telephone can be put upstairs and the other one down.

The new Chicago Independent company, the Illinois Tunnel Co., has shown a disposition to do many things that have been considered unworthy of attention by other companies, yet which are right along the line of important precedence set in other lines of business. One of the many important innovations forming part of the plans of the new company is the establishment of the service department.

The purpose of this department is, first, to concentrate all complaints to one recognized source instead of having them reported to departments not equipped to give them immediate attention. The service department will have a large number of inspectors whose duty it will be to call on each subscriber to the service, and ascertain whether or not he is getting satisfactory service. No complaint is too small to receive attention and prompt adjustment by the company through this department. The service inspectors are instructed to assume the subscriber's side of the case. Thus, it will be seen that there can be no occasion for subscribers to this service now, or in later years, raising an old complaint.

New Device for Advertising Independent Long Distance Facilities for Local Companies.

While telephone managers know what excellent facilities the Independent companies are building up for long distance service, and especially the short haul business, which they can usually handle to better advantage than the Bell companies, this knowledge is not as widespread among the people as it should be. The up-to-date business getter of an Independent company is constantly striving for economical but effective ways of impressing upon the user of local service the fact that the Independents can save him time and money if he will use their long distance lines.

Norman Furst, superintendent of the St. Joseph, Mo., Home Long Distance Telephone Co., has hit upon a scheme of advertising, which employs a new device on covers of local directories. The illustration shows a blank for a cover in which may be filled in the name of the local company and its officers. The use of this cover involves no expense for the local company and brings it in business, at the same time adding to the receipts of the connecting toll companies and other local companies at the remote ends of the connections, as a result of this advertising. There are about

Cover Design for Local Company's Use.

100 local companies in the vicinity of St. Joseph which could use this type of advertising to advantage, and it is fair to predict that when they do so they will see an early improvement in their revenue.

Oklahoma Corporation Commission to Pass Upon Bell Telephone Company's Contract.

The corporation commission of Oklahoma is asked to pass on the legality of the contracts which the Pioneer Telephone Co. requires all subscribers to sign, in a complaint filed by a law firm at Ardmore and Davis.

The complaint grew out of the fact that the company refused to install a telephone for the firm in its office at Ardmore until such a contract was signed. Objection is made to the requirement that three months rental be paid in advance, to the fact that the contract is self-renewing, that is requires the subscriber to abide by rules of the company, which are unknown to him and subject to change without notice; that the number of the telephone may be changed at any time, and that the service may be discontinued at any time for breach of contract, with the telephone company acting as the sole judge of whether such breach has occurred.

Some Observations on Telephone Transmission*

This Paper Sets Forth Historical and Technical Data, and Elucidates Principles Which are of Great Value to Railway Officials Dealing with Telephone Problems, and Equally So to Executive Officials and Engineers of Commercial Telephone Companies

By J. L. McQuarrie

Since the beginning of the industry, telephone engineers and inventors have been confronted by two problems with respect to transmission: First, to increase the possible range of communication, that is, the distance over which it is possible to provide a satisfactory grade of telephone conversation; and second, to cheapen the methods or means of furnishing this transmission.

The reason for development along each of these lines is at once obvious. The range of telephone transmission can be extended either by increasing the efficiency of the instruments employed, or by increasing the efficiency of the line. The cost of providing telephone facilities can be reduced either by improving the instruments or by cheapening the line while maintaining a given standard of efficiency, since for a given grade of transmission with improved telephone instruments, a cheaper type of line is possible. This, by the way, illustrates one difference between the telephone engineer's and the power engineer's problem. As a general rule, an increase in efficiency of the generating or receiving station apparatus would not justify the power engineer in decreasing his line efficiency, at least to any marked extent.

The success which has attended the efforts of telephone engineers is attested by the fact that, while at the outset it was possible to communicate only between rooms within a building, commercial service is now being given between New York and Denver, and the limit of such service has not yet been reached.

As to Receivers and Transmitters.

The receiver in its early form proved to be a remarkably sensitive instrument and it was, therefore, not susceptible to the same degree of improvement as the transmitter. Many varieties of receivers were constructed at the outset, the variation consisting principally of different arrangements of the magnets, but the form of the old hand telephone persisted so that the present standard instrument closely resembles the early type. It is about 15 per cent. or perhaps two miles of standard cable, more efficient, however, because of the employment of an improved magnetic circuit.

Very loud speaking transmitters and receivers have been exploited by inventors from time to time, and powerful transmitters have been constructed, arranged to carry a large current, which substantially extended the range of transmission. Loud speaking receivers have also been produced which are capable of being used satisfactorily without being placed to the ear. Such instruments have not been found to be useful for regular commercial service, although they have been employed in some special cases. An equipment of loud speaking receivers is now being tested by one of the large railroads for tower service in connection with a train dispatching circuit.

One of the most interesting problems concerning telephone transmission is that of the repeater. The demand for an instrument which would relay the voice currents was very early appreciated and much thought and labor have been devoted to this subject. The problem of the repeater consists really of two problems: first, a device for amplifying weak telephone currents without distorting them; secondly, an arrangement of circuits which will permit repeating both ways without switching. A repeater which accomplishes both of these objects has been employed on the long lines of the American Telephone & Telegraph Co. for about six years. This repeater is capable of improving the transmission by 100 per cent., which means, in terms of 210-pound copper circuit, an increase in talking distance of about 250 miles.

Telephone Lines and Improvements Made in Them.

The instruments which are employed for telephone transmission must of necessity be of a somewhat delicate nature because the energy with which they deal is of small magnitude. This, coupled with the fact that they are subjected to severe treatment in service makes it essential that they be of substantial design, and that they be manufactured with great care. Uniformity in the product is also a very important factor.

The foregoing deals with the instruments. The lines which form a very important part of the telephone equipment will next be considered.

It was to be expected that the first telephone lines should be similar to the then existing telegraph lines. Iron wire and grounded circuits constituted the early practice, and many years elapsed before proper attention was devoted to the lines to adapt them to the peculiar requirements of telephone service.

The first important improvement in the line plant consisted of the introduction of metallic circuits. This change was a measure of necessity to prevent disturbances caused by other electric circuits, as well as to avoid objectionable crosstalk between adjacent telephone lines.

The next improvement of importance in the line plant affecting transmission was the employment of hard drawn copper wire in place of iron. The limitations of iron wire were appreciated as soon as efforts were made to extend the range of transmission, and, while copper had previously been used for electric circuits, it was not suitable for aerial lines because it was too soft. T. B. Doolittle developed a process for manufacturing hard drawn copper wire, and this was the first important step toward the realization of long distance telephony.

As the business grew, and the demands for service increased, the congestion of overhead wires in cities led to the employment of cables.

Development of Cable to Replace Open Wire.

Following the development of the hard drawn copper wire, and of the dry core paper cable, some years later an invention was perfected which provided a means for not only extending the limit of telephone transmission but also for effecting economies in the construction of the lines. Especially in the case of cables the economies are so great as to permit the use of underground cables between points which, without this means, it would be practically impossible to connect by cables. This is of great practical advantage since overhead lines are notably subject to trouble from storms, while cables are free from such troubles. The invention to which I refer is the use of loading coils in the lines. This invention, more than any of the preceding improvements, marked the application of scien-

*Abstract of a paper presented at the Boston Convention of the Association of Railway Telegraph Superintendents.

tific principles to the problems of telephone transmission.

In the early records of tests on telephone transmission through cables are to be found statements to the effect that the transmission over cable circuits is equally as good as that over open wire circuits. As the length of cable was increased, however, it was soon found that this was not the case and that telephone transmission was reduced very much more by passage through cables than over a corresponding length of open wire line employing the same gauge of copper conductor. It was quite early recognized that, since the cable had very much larger mutual capacity than the open wire line, telephone transmission must be poorer than the cable. This conclusion developed from the scientific work performed by the late Lord Kelvin in connection with submarine telegraph circuits. What was not realized, however, for many years, was the fact that in the case of open wire lines there was present, to a considerable degree, what may be termed, from the point of view of the telephone engineer rather than from a purely physical standpoint, a "corrective element," namely, the self-inductance of the line. In the case of cables, due to the fact that the two wires are very close together corresponding to the non-inductive winding of a resistance coil which is familiar to you all, the self-inductance of the circuit is a minimum. In the case of the open wire line, the wires being 12 in. or more apart, the self-inductance has a comparatively large magnitude and is of great importance in telephone transmission. For instance, in the case of a No. 8 B. W. G. copper circuit, which has a conductor weighing about 435 pounds per mile, the range of commercial transmission between stations equipped with standard instruments is about 1,000 miles. If we could conceive of the wires being left 12 in. apart so that the capacity would be the same as at present but in some mysterious manner the self-inductance of the circuit would be obliterated, the commercial range of transmission over this circuit would be reduced to perhaps 350 miles.

I present this as an illustration of the importance of self-inductance in telephone circuits. Of course, if we could by some means avoid the capacity in a telephone circuit, we would prefer not to have the self-inductance present. If, however, the capacity is to be present, to obtain an efficient telephone circuit, a comparatively large amount of self-inductance should also be present.

Why the Pupin Coil Came Into Being.

It was pointed out that to improve the transmission over open wire lines, the self-inductance that was present should be substantially increased and that over cables where the amount of self-inductance was almost negligible, it should be still further augmented in order to obtain the best results, and it was suggested that one method of increasing the inductance of the circuit would be to insert at intervals self-inductance coils, one winding in each of the two wires of a metallic circuit, or else a separate coil in each wire. No one, however, seemingly was able to show the telephone engineer how to introduce these coils into the lines.

Professor Pupin, by mathematical investigation, checked by experiments, about ten years ago furnished the telephone engineer with a practical plan for the employment of self-inductance coils which came to be known as "loading coils," this designation being derived from the analogy of the telephone circuit, with a string loaded with weights at intervals. For the benefit of those who may be interested I will digress for a moment to amplify on this analogy. If a long string is fastened to a support at one end and the other is moved quickly at right angles to its length, waves will pass along the string. If the string is sufficiently long, these waves will die out almost completely before reaching the fixed end. The distance which the waves will travel before being reduced to a given fraction of their original height or amplitude, will depend upon four factors, namely, upon the frequency or number of times per second the free end of the string is moved from one extreme position to the other and back; upon the frictional losses due to the stiffness of the string and to friction between the string and the air; upon the mass of the string per foot length; and upon the tension under which the string is held. It can be shown mathematically and also by simple experiments that if, instead of a uniform string of a given mass per foot, a very light string with such weights at uniform intervals as to give the same average mass per foot is employed, the waves along the string will start out with the same amplitude for a given movement of the free end of the string, and will die away at the same rate, provided the number of weights per wave length along the line is sufficiently great. Without pointing out the complete analogy between a motion of waves along a string and the telephone circuit, it may here be said that the telephone current is transmitted in the form of waves, and as these current waves progress along the conductor, they become altered in form as a result of counter influences inductively created by the current wave itself, and inasmuch as the loudness and clearness of transmission is determined by the accuracy of reproduction of the wave form, and by its amplitude or height, the effect of the action of these inductive influences is to impair the transmission efficiency of the circuit. In seeking a remedy in the case, the object to be obtained is to preserve the original form and amplitude of the wave as far as possible. In the case of the string, it is found that for a given frequency, tension and amount of frictional losses, the larger the mass per unit length the greater the distance a wave of a given amplitude will be transmitted before being reduced in height by a given amount.

The mass of the string corresponds to the self-inductance of the telephone circuit and just as the mass of the string can be increased by adding weights, a certain number per wave length, so the self-inductance of the line can be increased by adding masses of self-inductance; that is, inductance of loading coils, a certain number per wave length.

In practice, therefore, small coils of copper wire, wound on iron cores, are connected in the telephone circuit at proper intervals and the effect of this on the current wave corresponds to the effect of the weights attached to the string, with the result that the form of the current wave at the receiving end of the line is comparatively unaltered, and its original height or amplitude is less reduced.

Loading has been very successfully employed on open wire lines and on underground and submarine cable circuits. An idea of the improvement in the transmission which results from the use of loading coils may be gained from the statement that where conditions favor loading, the 175-pound copper open wire circuit by loading is made equivalent in transmission efficiency to a 435-pound copper open wire unloaded circuit. In the case of cable, still greater relative gains in efficiency are possible: for example, a No. 19 B. & S. gauge cable suitably loaded has a higher telephonic efficiency than a No. 10 B. & S. gauge cable non-loaded. The No. 19 cable conductor weighs but one-eighth of the No. 10.

Use of Phantom Circuits Becoming More General.

Phantoming has been employed in the past to produce economy in the telephone plant, because the phantom circuit provides a means for obtaining an additional line from two existing lines. It is but recently, however, that advantage has been taken of the increased efficiency of the phantom circuit to extend the range of transmission. The New York-Denver line lately placed in service, and the Boston-Washington underground cable now being laid,

are examples of the latest advances in this branch of the art. The New York-Denver line is composed of a phantom of two pairs of 435-pound copper between New York and Chicago, a single pair of similar conductors between Chicago and Omaha, and another phantom of two pairs between Omaha and Denver. The really remarkable feature of this circuit is that the phantom itself is loaded. The transmission over this circuit is equivalent to that of 30 miles of standard No. 19 gauge cable. The Boston-Washington cable is composed of 14 pairs of No. 10 B. & S. gauge conductors laid up into 7 quads for phantom working and 36 pairs of No. 13 B. & S. gauge conductors laid up into eighteen quads for phantom working, with 6 pairs of No. 13 B. & S. gauge and 18 pairs of No. 16 B. & S. gauge conductors not laid up into quads. By the use of the phantom principle it has, in this instance, been possible to increase the number of telephone circuits through the cable by 25. In addition to this, the phantom circuits have a higher efficiency than the circuits in pairs of the same gauge. By means of this cable it will be possible to talk very satisfactorily from Boston to Washington over the No. 10 gauge phantom circuits. The smaller gauge circuits will be used for connecting the towns less remotely situated.

(To be concluded.)

Three Selectors in Scranton Office of D., L. & W.

The photograph on this page was sent to TELEPHONY by J. J. Graf, telephone engineer of the Delaware, Lackawanna & Western Railroad Co. It shows the dispatcher's office at Scranton, Pa., with equipment for three "Gill" circuits in operation. These circuits serve the following: Bloomsburg division, Scranton to Northumberland, Pa., single track, 85 miles; Northern division, Scranton to Binghamton, N. Y., 63 miles, double track; and Eastern division, Scranton to Washington, N. J., 78 miles, double track.

Dispatcher's Office, D., L. & W., Scranton, Pa.

The office in the distance is that of the chief dispatcher, Geo. Murphy, occupying the chair.

The system as showin is entirely flexible. The chief dispatcher is able to cut in on all circuits, while the dispatchers are able to reach all local officials and stations of the P. B. X., which consists of six positions.

All wiring is concealed in conduits, there being no open wire in the system.

Mr. Graf says the D., L. & W. company was the first in the United States to be 100 per cent. equipped with telephone dispatching, accomplishing this on October 1, 1910, with a telephone system comprising a total of nine circuits, covering 1,049 miles of road.

Indiana Dispatcher Shows Appreciation in Verse.

TELEPHONY's railway department is now recognized as an established institution, and talent which has been hidden is bound to come to light. Mr. C. S. Rhoads, Jr., sends in a copy of verses written by the dispatcher at Peru, Ind., on the Lake Erie & Western Ry.

Of course, it is well known that dispatchers, especially those in Indiana, have a natural talent for poetry; and those who have the telephone get a better chance to let their imaginations run in this channel. The following strikes us as being "good dope":

I wrote a little article some time ago,
Pertaining to the telegraph and telephone and how they go;
The telegraph is fine I've heard the old dispatchers say,
But I use the telephone each and every day;
They work so very easy, so much more pleasant too,
So I'll just keep the telephones—won't you?

We call an office easy, and all at once,
But on the telegraph it takes about a month.
You get an office, and he says he's "been right here,"
But on the 'phone you've got him by the ear.
The telegraph has its troubles, that's up to OO,
So I'll take the telephones—won't you?

We don't work near so hard; in fact, I think it's play.
The 'phones are not so risky as some folks say,
And, believe me, we get just as much pay,
I ought to know, I work every day.
They use them on lots of roads and give satisfaction, too,
So I'll take the 'phones, too—won't you?

The cussin' is now over, thank Sandwich and her men,
For we'll keep right on using this same old blend.
Our troubles are now over, for we pound the brass no more;
We turn the wheel, and get them right off the reel,
What more can you expect them to do?
You may leave the 'phones right where they are—thank you.
—H. B. Lumley.

New L. & N. Telephone Line on Heavy Traffic Division.

The Louisville & Nashville Railroad Company is installing telephone train dispatching service equipment along its route from Lexington, Ky., to Cincinnati, O., and expects to have the line in working order in the near future. The installation of this branch will complete the telephone system which the L. & N. proposed some time ago to install along its main line between Louisville and Cincinnati, following a very satisfactory try-out which had been given the system along the less important branches of the road.

Oklahoma Commission Orders Copper Wire Installed.

On complaint of L. L. Stine and other citizens of Woodward, Oklahoma, against the Home Enterprise Telephone Co., of that city, in regard to long distance service, the Corporation Commission has issued an order requiring the company to install a copper wire between Woodward and Alva. The line between those two points has been of iron wire, and the commission on investigation found that it was impossible to get satisfactory service over such a line, either from Woodward to Guthrie or from Woodward to Wichita, Kans., via Alva. The Pioneer Telephone Co. was also directed to install in its office at Alva proper equipment for making connections with the Home Enterprise line.

Permits Reduction to Meet Competition in Nebraska.

The Railway Commission of Nebraska has permitted the Bell telephone company to reduce its rates at Grand Island. Individual telephone rates are reduced from $2.50 to $2 a month and two-party line telephones from $2 to $1.50. This reduction meets the rates made by an Independent company on residence telephones.

Problems in Telephone Traffic Engineering

This Valuable Paper, Presented at the Chicago Convention of the American Institute of Electrical Engineers, Was Begun in Last Week's Telephony, and Will Be Reproduced in Full—It Touches Briefly Upon the Most Advanced and Interesting Traffic Work

By F. P. Valentine

General Superintendent of Traffic, New England Telephone & Telegraph Co.

As a result of the establishment of standards of service quality and labor efficiency, it has been possible to institute methods of selecting and training an operating force with a degree of success otherwise impossible. The question of fitness is of primary importance and the matter of intelligent selection of operators is the result of many years of careful study of the qualities essential to success. All accepted candidates for operating positions are required to spend one month in the operators' training school, listening to lectures in regard to the handling of all types of calls, with the necessary study and examination hours, and in practical operating work under capable instructors on a regular working switchboard representing a typical central office, the calls being originated by instructors. No operator is allowed to work at a central office and handle the calls of telephone users until she has graduated from the school course and met a certain standard of requirement. With this training she has a thorough knowledge of how all classes of calls should be handled and only needs experience to settle that knowledge and acquire speed. This same course of training in modified form, is carried on in the smaller central offices where it is not economical to maintain a regular operators' school.

On an average it takes about a year for an operator to attain maximum efficiency. In view of the fact that, as in any large body of employes, there are constantly resignations and occasionally dismissals for cause, together with the steady growth in subscribers and traffic, it is obvious that the problem of maintaining at all times an adequate and suitably trained operating force, is a very important one. Even with the most constant care in selection incompetency will develop in a certain percentage of the cases either during the school training course, or later, in the work in the central offices. On account of the reasons enumerated, it has been found that in order to produce a force of one year's average experience it has been necessary to start and partially train, or train and keep in service for a short period only, at least three for every one who stayed a year. As it costs over $200,000 per year to train central office operators in the territory of the New England Telephone & Telegraph Co., it is obvious that this is a problem well worthy of careful study.

In order to meet this problem, all conditions of employment and work have received most critical anaylsis. The operating loads have been most carefully determined, having in mind the physical well being of an operating force. Working conditions have been made as pleasant and comfortable as possible. In addition to a liberal lunch hour, a fifteen-minute relief period is insisted upon in the midst of each half-day period. Commodious and tastefully furnished rest rooms are provided, magazines and periodicals supplied, and everything possible done to make the work attractive and free from excessive nervous strain. Vacations, with pay, are allowed once during each calendar year. To further the careful study of working conditions and of the human element as it enters into the problem, for over two years the New England company has employed a physician of highest standing to make a special study of all phases of these conditions.

A careful record is kept of each employe from the time she enters the service of the company to the time she leaves. This record shows the character of the employe's work, comments of her superiors, results of service observations, and every detail that has a bearing on her efficiency. Such a record is essential in the determination of proper wage increases, and the record of reasons for resignation or dismissal is of especial value in the study of ways and means of maintaining a stable operating force.

This carefully studied system of selection, training and caring for employes, with adequate compensation for efficient work, based solely on merit, has had good results, as is indicated by the fact that during the past four years, it has been possible to increase the average length of employment of the operating forces by 20 per cent., while there is always a waiting list from which to select candidates. It would seem obvious, therefore, that as a large factor in the efficiency of labor the study of the development and maintenance of a proper operating force is essential.

Efficiency of Operating Methods.

The efficiency of operating methods is in their adaptability to produce the required quality of service with the minimum of effort, labor and operating time per call, together with an economical use of switchboards, trunk and toll circuits.

The methods of handling local calls have been fairly uniform for a number of years, the greatest improvements having been made in specializing the operation for irregular calls, or those which cannot be completed at once by the *A* or subscriber's operator. Another step toward the application of efficient operating methods, brought about by the careful study of recent years, is the gradual elimination or diminution of abnormal types of service, such as heavily loaded party lines in congested centers, etc., which tend to degrade the quality and economy of service.

In the field of toll service, except in a few notable instances, progress was not as great up until comparatively recently. Toll services must be considered in two classes—"short-haul," or suburban toll, and "long-haul," or "long distance" toll. Within a comparatively short radius of most large telephonic centers are usually found a number of smaller communities closely related to the large center and with each other in a business and social way. The telephonic traffic between such offices is of the class first mentioned and usually constitutes a very substantial portion of the toll business, the traffic to more distant points, covered by the second class mentioned, being in the minority.

Toll operating methods have been the subject of most critical analysis for the past few years, resulting in the standardization of several different types of toll operation, each designed to be applied under given conditions.

The subject of operating methods is so fundamental to efficient operation in all its phases that it has received and is receiving very comprehensive study. Every suggestion must receive most careful and critical consideration in order to detect any inherent weakness and to guard against the introduction of a method which, while apparently

harmless and even efficient under existing conditions, might fail to meet the requirements of a constantly increasing traffic.

So far as concerns the production efficiency of various operating methods, the use of the unit system, hereinbefore outlined, provided a means of determining the relative efficiency of the different methods. The effect of any change from one method to another can be predetermined by the application of the proper coefficients to the traffic involved.

PRODUCTION EFFICIENCY OF CENTRAL OFFICE EQUIPMENT.

The amount of central office equipment necessary is directly dependent upon the number of equated or unit calls to be handled during the average busy hours, or, in other words, upon the number of employees for whom it is necessary to provide switchboard positions during the average busy hours. With service of standard quality, labor production at standard efficiency, and efficient operating methods, by use of the unit sysetm applied to the amount of traffic to be handled, the switchboard requirements can be accurately determined. The discussion of operators' loads and Fig. 1 in the preceding section apply also to the determination of amount of switchboard.

In engineering central office equipment it is customary to engineer on a basis of a fifteen to twenty year ultimate capacity and to install initial equipment sufficient to cover from two and one-half to three years' growth. As it is necessary to know the ultimate requirements for buildings, etc., these are developed through special studies or "fundamental plans" which include the consideration of all factors that have a bearing on the future development. In order to determine the probable growth in subscribers, it is necessary to maintain curves of growth for past years for each class of service sold. These curves are projected to the ultimate period, and corected periodically from actual growth. With the curves of station growth is maintained a curve of the station calling rate in each class of service. From these records, supplemented by the yearly estimates of growth, can be determined the number of stations, and volume and type of traffic to be expected at any future period. By application of the equating process to the various classes of traffic and obtaining the number of unit calls to be handled, it is possible to forecast accurately the amount of switchboard required.

The production efficiency of central office equipment is determined by the output per position, or per dollar of investment. The unit system furnishes means of determining the relative efficiency of different types of switchboard for handling particular classes of service under given conditions. Given the desired standard quality of service, the production capacity of a given switchboard unit of any type can be predetermined, and actual results attained can be checked, by the proper use of the unit system. The relative economy of different types of boards must be balanced against other costs incidental to the case under consideration.

(To be continued.)

South American Company Builds Long Distance Line.

The Ecuador Long Distance Telephone Co., of Guayaquil, Ecuador, S. A., has recently completed the first long-distance telephone line between the cities of Guayaquil and Quito, a distance of 260 miles apart. The line was constructed under very trying conditions, passing over very rough mountainous country. It consists of two metallic circuits built of No. 9 copper wire. In the mountainous districts Eucalyptus and Mangle poles were used, and near the coast 30-foot, 4-inch steel railroad ties. The company now has several branch lines under construction to tap the rich cocoa districts near the coast.

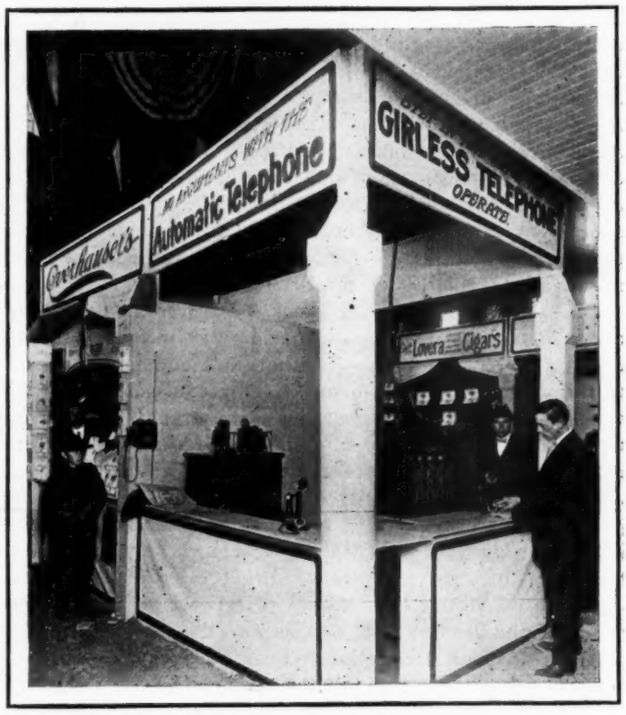
The Ecuador company's system was constructed under the direction of L. H. Anderson, superintendent of the company. Mr. Anderson was formerly connected with the Panama railroad. C. S. Wynn is president of the company.

Spokane Home Independent Demonstrates Its New System at Merchants' Association Carnival.

The Home (Independent) Telephone Co., of Spokane, which recently launched its automatic system in that city, is losing no opportunity to compel attention and demonstrate the superior advantages of its service.

At a recent carnival held in the United States Armory, under the auspices of the Merchants' Association and the United Commercial Travelers, the company installed a demonstrating booth where in one week it instructed 10,143 persons in the use of the automatic. As there were more than 30,000 admissions the Home company feels that in telling one-third of that number about its system it secured some very desirable advertising.

A section of switchboard, loaned by the Automatic Electric



An Interesting and Instructive Display.

Co., of Chicago, was set in an all-glass case, and a miniature exchange was thus established. When the person calling operated the dial of either wall or desk set he could see the mechanism working. Thaddeus S. Lane, president of the Home company, believes that the educational feature of the display was one of the best exploiting systems yet hit upon for his company, in which more than $1,000,000 has been invested.

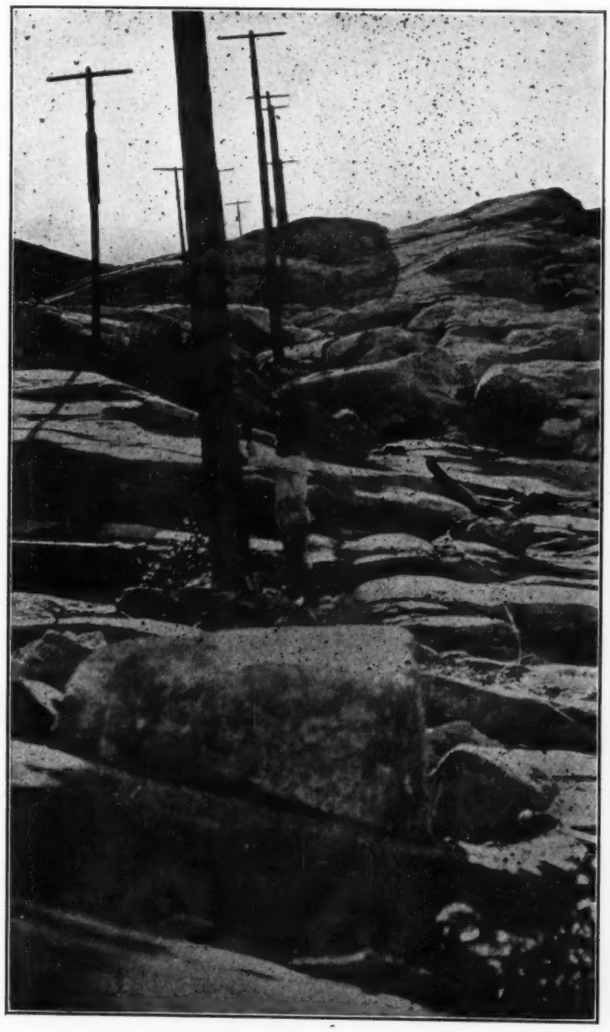
Pioneer Company Erecting Wireless Station.

Employes of the Pioneer Telephone & Telegraph Co., are erecting a wireless receiving station on the Pioneer telephone building in Oklahoma City. It is reported that this work is being done with the approval of officials, and that several stations will probably be erected at different points within a radius of twenty-five miles from Oklahoma City. A possibility of facilitating maintenance work after disastrous storms is foreseen, and it is believed that the operation of the wireless system will prove to be practical in every way.

Some of the Difficulties of Telephone and Telegraph Construction Along Spokane-Seattle Line.

A very graphic conception of the character of the country which is traversed by the recently constructed lines of the Postal Telegraph-Cable Co. between Spokane and Seattle, Wash., is given by the photographs reproduced on this and the following page. These lines, as TELEPHONY has reported, were built for both telephonic and telegraphic purposes, and a contract has been entered into between the Postal and the Interstate Consolidated Telephone Co. by which the latter has the privilege of using them for long distance traffic between the Inland Empire and the coast.

While the photographs indicate the magnificently rugged nature of the country through which the lines were built, they also present vividly the difficulties of construction in that field and show by contrast how vast an advantage the engineer in the flat lands has over his brother in the mountains. The illustrations are here reproduced through the courtesy of C. J. Nally, vice-president and general manager of the Postal Telegraph-Cable Co.



A Rocky Place to Plant Poles.

Good Service the Only Basis of Revenue.

A telephone company has only one thing to produce its revenue, and that one thing is service. Mr. Albert Schuyler, general manager of the Santa Barbara Home Telephone Co., enlarged upon this idea as follows, in a paper read at the last convention of the California Independent Telephone Association:

I have no sympathy for a telephone company whose stockholders, bondholders and directors want dividends regardless of the kind of service they render their subscribers.

The successful telephone company enjoys the confidence of its patrons, and deserves such confidence by furnishing first-class service.

The American people are willing to pay a reasonable price for such service, and the Independent or Home companies are, as a rule, coming nearer to giving it than the Bell companies, because they are closer to their patrons. The stock and bondholders, also the directors and general managers of the Independent or Home companies, are all interested to a great extent in the general welfare of the communities which their systems serve, and they all take pride in having their subscribers tell them that their service is better than that of the other company. Then again, they insist that they themselves receive the service to which they are entitled.

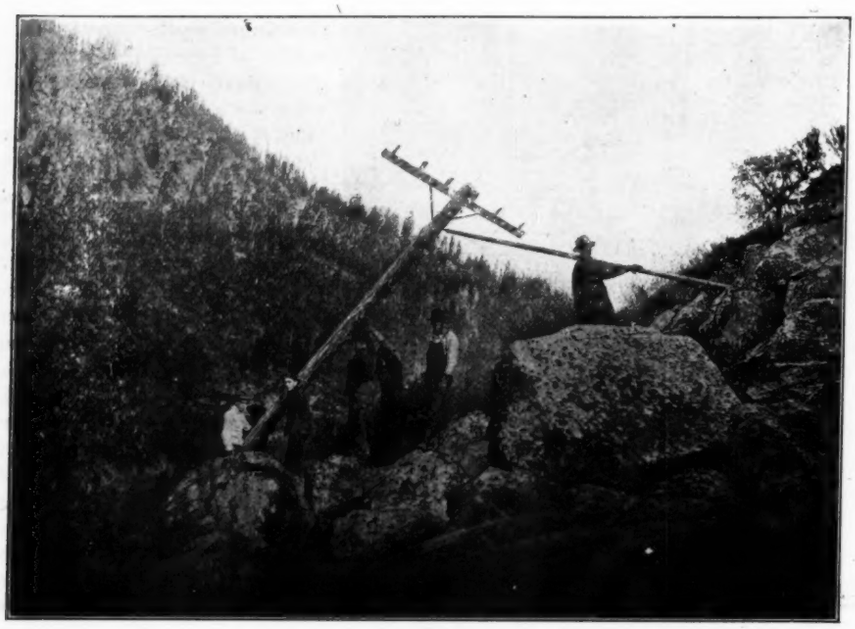
Right along with the item of service comes the question of our relations with our customers. This is quite an important thing to consider, and it is quite a difficult task to have our numerous employes deliver the treatment to, and maintain their friendly relations with, the public, and that we so necessarily must have in order to insure our success. We all know that our satisfied and good paying customer today might turn away from our company tomorrow, and become a good paying customer of the other fellow, through the treatment he may receive from a laborer, lineman, troubleman, operator, collector, cashier or office attendant in our employ. A company is judged by its patrons, to a certain extent, in accordance with the treatment and service which they receive from the employes of the company. The average subscriber thinks that the troubleman, operator, collector, solicitor and office force, whom he happens to meet in his transactions with the company, are the direct representatives of the company. And so they are, to a certain extent. Therefore, they should all be educated, as far as possible, to the value of their conversations and dealings with subscribers while in their several capacities.

Magnificent Scenery Probably Lost on Construction Crew.

An Odd Suit.

Mrs. Bertha Busse, residing in a suburb of Lincoln, Neb., has sued the Nebraska Telephone Co. and

the Lincoln Traction Co. for injuries alleged to be due to electric shock. She alleges in her petition for damages that the wires of the two defendant companies became entangled, and being highly charged with electricity hung down and came in contact with a wire fence. The fence in this manner became charged, the electricity being carried to the fence surrounding the barnyard down on the Busse farm, some distance away. When the plaintiff leaned over the wires of the latter she was severely shocked and claims that she received permanent injuries.



A Rough Bit of Work—Spokane-Seattle Line.

1,800 Telephones for McAlpin Hotel.

What the telephone officials say is the largest telephone contract ever taken has just been signed by Mr. Frank M. Andrews, president of the new McAlpin Hotel, which will be located on Broadway and 34th street, New York City. The McAlpin Hotel will be the best telephoned building in the world, having more telephones than many of the towns surrounding New York. The contract covers 100 trunk lines, 1,800 stations and 500,000 local messages, furnishing the telephone company an annual guaranteed revenue of $28,334.

A supplemental contract provides for a charge of $2,250 covering the installation of 16 telautograph instruments which will be located at various points of the hotel, in addition to the 16 regular operating positions of the switchboard. In addition to the main switchboard there will be three sub-switchboards. One two-position switchboard, to be used for pay station purposes in connection with 17 booths to be located in the main corridor of the hotel; one in the engineering department, to serve about 16 stations; and another in the general offices of the hotel, to take care of about 12 extension stations for the use of the hotel management. As will be observed, the McAlpin is to be modern in every way.

A Cable Testing Circuit Made from Ordinary Material.

Mr. George Murphy, Greenville, Ohio, in a recent letter to TELEPHONY, describes an induction cable testing outfit which he has made from material found on the exchange storage shelves. The interrupter is made by mounting a Stromberg-Carlson No. 11-A special induction coil, with primary 20 ohms, secondary 100 ohms, on a wooden base. Four binding posts and an interrupter mechanism are set up in connection with the coil, and wired to send a pulsating current from battery out over the faulty cable pair. The exploring coil, wound to 1,500 ohms, is connected to a Stromberg-Carlson 1,000 ohm No. 17-A special receiver.

If further details are desired they could doubtless be obtained on application to Mr. Murphy.

Wireless Used Underground.

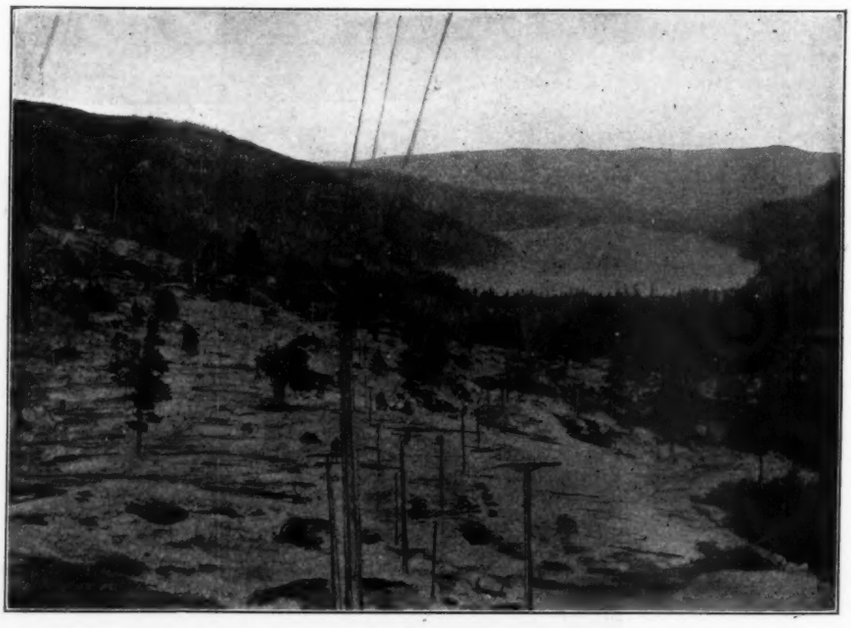
An unconfirmed report from Berlin states that two German scientists, Dr. Leimbach and Dr. Loewy, have successfully applied wireless telegraphy for underground communication. Messages have been sent between the potash mines in the North Harz mountains, a distance of nearly a mile and a half, at a level of 1,600 feet below the surface.

Meeting Enjoined by Telephone.

Stockholders of the United Drug Co., who had planned to dissolve the company at Jersey City, were enjoined by the court over the telephone.

Long Distance Rates in Spain.

Rates for long distance telephone service in Spain, for conversations of three minutes or less, are nine cents for thirty miles, twenty-two cents for 125 miles, forty cents for 250 miles and seventy-five cents for 500 miles. A new system has also been inaugurated for the transmission of telephone messages. A fifteen-word message destined to any point without the province of Malaga may be sent for nineteen cents; to any point within the province, for nine cents. These messages are received on blanks similar to those now in use for the telegraph service.



Looking Down Into the Valley—Spokane-Seattle Line.

Practical Letters from the Readers

Current for Electric Light Transmitted Over Phantom.

An electric light was needed during the installation of a switchboard at Courtenay, N. D., but current could not be obtained locally, as there was no power station. The district wire chief of Fargo, who was supervising the work, decided to try to bring current in from Fargo, 120 miles away, over toll lines.

Connection was made at Fargo to 220 volt d.-c. mains. One side of the lightning circuit is grounded, and this made it possible to use the grounded phantom principle for transmission over the toll lines.

The circuit over which the current was transmitted consisted of one phantom made up of two circuits of No. 12 copper and one metallic circuit of the same kind. The coils used were the No. 37-A type designed for phantoms.

The secondary of a coil was connected to each line, the primary going to the switchboard. Current was fed onto the two lines in multiple through connections to the middle points of the secondaries. Before reaching the coils the current was taken through a lamp to reduce it to the proper amperage. The circuit was fused between the main and the coils. Coils were put on the lines at Courtenay in the same manner and the current fed from the middle points of the secondaries through the lamp to ground. Thus the two lines, one consisting of four No. 12 copper wires and the other of two No. 12 copper wires, were used in multiple, making the resistance of the line equal to one-sixth of the resistance of one No. 12 copper wire, or about .6 ohm per mile.

The lamp used at Courtenay was a 16 c. p. carbon filament lamp. It was lighted to its full candlepower and gave a good, steady light.

The direct current used had no inductive effect on other circuits on the same pole line. The lead on which these circuits are run is a 30-wire lead, but none of the circuits were made the least bit noisy by the current on the two lines. The lines were used for long-distance service while light current was flowing over them, and service was not affected in the least. Courtenay, N. D. W. A. Hatch.

Additional details of this interesting piece of work are furnished by M. E. Young, Fargo, N. D. as follows:

For one side of the necessary circuit an existing phantom circuit from Fargo to Courtenay was used by merely adding another phantom.

For the other side he used a physical Fargo-Courtenay circuit by phantoming it.

This accomplished, 220 v. d. c. lighting current was supplied from Fargo through a 5 amp. fuse and 660 ohm resistance lamp each side of the circuit.

All circuits are No. 12 B. S. gauge copper wire, transposed for the first 60 miles on the 30 wire plan and, for the remainder of the distance, on the 20 wire scheme, and as all the transpositions were correct and the lines perfectly balanced not the slightest interference was noticeable on either the circuits in use or adjoining ones.

Fourteen phantom coils entered into the combination, though only six were used exclusively for the experiment.

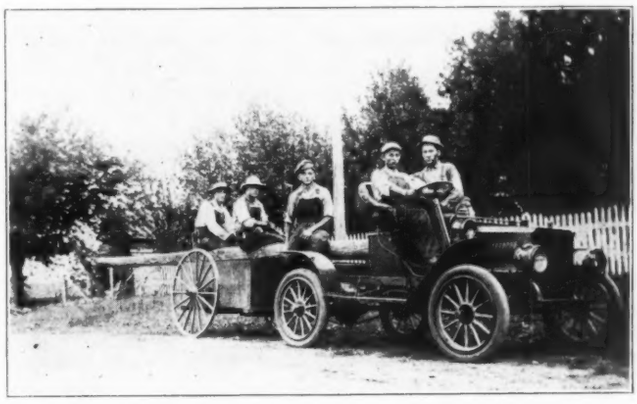
At the Courtenay end a 110 v. 16 c. p. was attached and found to burn with a steady brilliant light which was not only used every evening to good advantage by the installer, but proved to be a good advertisement, through the curiosity it aroused among the people when told that the current was supplied from Fargo over lines that were simultaneously carrying telephone messages.

It is evident that transposing and balance must be perfect to insure success in any similar experiment.

Declares Automobile Eminently Practical.

In sending TELEPHONY the photographs which are here reproduced, A. S. Hedge, of Pella, Ia., says:

"I have read with interest a number of articles with regard to the use of the automobile in the telephone business. We use a car for a great deal of our work and find it more satisfactory than the old way. The accompanying

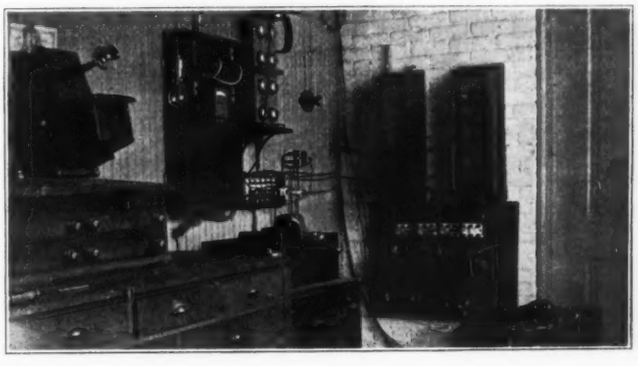


One Use of the Automobile by Telephone Company.

photograph explains some of the uses to which we put it. This is a two-cylinder, chain-drive Reo, eight years old, and she is ready for a trip any time occasion requires.

"The other photograph is a corner of the work room of the Fowler Telephone Co., showing two Kellogg converters, a Cracraft Leich automaphone, our test boards, etc."

Mr. Hedge states that considerable rebuilding was done last year on the toll and farmers' lines. "Much more is planned for this season," he adds, "including the installation of about 8,000 ft. of cable, 3,500 ft. of which will be underground, conduit for same having already been laid."

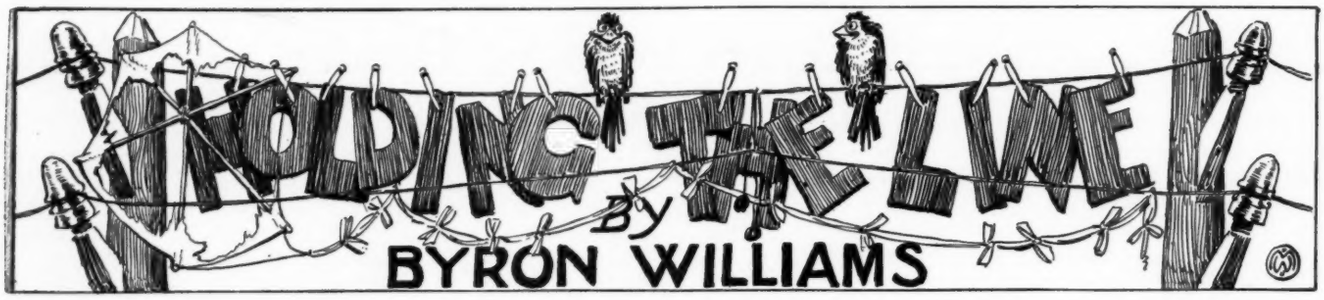


Corner of Work Room at Pella, Iowa.

Mr. Hedge concludes by saying: "If this meets the eyes of any of my old friends, I would be more than pleased to hear from them, as I am always glad to get a letter from 'one of the boys.'"

Twisted Pair Wire Imbedded in Tree

A photograph of a section of twisted pair wire firmly imbedded in the limb of a Carolina poplar tree, is reproduced in the *Telephone News* published by the Bell Telephone Co. of Pennsylvania. The wire was covered by wood on all sides, and tightly held so that linemen pulling on it were unable to make it budge. It is reported, however, that no trouble affecting the service had been experienced on the line, and the insulation was remarkably good.



As It Happens.

The man was in a hurry and he rushed into the booth at his club to telephone his wife. He had forgotten his railway ticket and wanted "Jeames" to meet him with it at the 4:15 train that he might proceed in peace to whither he was bound.

He dropped a nickel in the slot and was rewarded by hearing a sound of life somewhere on the line.

"Hello!" he hawled. "Hello, central!"

Inasmuch as there came no response, the man said something under his breath, shifted his weight from one hip to the other and howled, "Hello! Hello!"

Then he joggled the receiver up and down and went back to the other leg for a prop. Once more he signaled the operator. Then with a mighty effort he controled himself and said, "Please, lady, give me my number, and be awfully speedy."

"Blub — blub — 56 Har. — 74 — blub — blub!" was all the answer he got. This made him mad and he slammed the receiver hard, screaming madly for a connection. Then he bumped his head on the door and kicked the plastering. Next he struck the offending telephone box on the proboscis and demanded to know why he couldn't get service. Again he put the receiver to his ear. There was a dull explosion, followed by screams and great suggestions of riot, havoc and a failure of crops. The building next door had shed a portico.

"Go to Gehenna!" screeched the outraged citizen, tearing out the receiver by the roots, wrenching loose the box, trampling on the ruins and yelling bloody murder in his fury. The gentlemanly clerk, seeing the man's red, white and green cuss words had set fire to the curtains of the telephone booth, turned in a fire alarm and called for a red cross nurse and a physician. When the ambulance arrived one of the first things the doctor did was to grab something from the man's mouth:

"Quit chewing that green cord!" he said gruffly. "Do you want to poison yourself!"

"Show 'em to me! Show 'em to me!" bawled the patient. "I can lick the whole outfit from the president down to the pole climbers!"

But it is said, if he is careful, and nothing happens to agitate him, he may be liberated from the asylum in three years. Some men go to an awful lot of bother to get even with the telephone company.

"And there was a sign on the door," said the clerk, "right in front of his eyes that told him the telephone was out of order!"

Don't it beat all!

William Strawney.

When I was a small boy out in Iowa, the local telephone lineman was William Strawney, a good-natured, rollicking Irishman. Telephones were not as "thickly settled" then as now, and the wonderful talking business had decided interest for the boys of the community, especially that part of it presided over by William. To see him put on climbers and walk up a pole was almost as exciting as riding down town and back with the local deliveryman. Strawney liked boys and used always to talk with us, laughing and joking in a manner akin to his nationality. Years passed and William and I drifted apart—but one day I put him into some simple verses that may appeal to grown-ups who have climbed poles or had to do with telephone matters:

Willyum Strawney comes along
An' he sez to me: "Hullo!"
"Goodness gracious," Willyum sez,
"It beats all how fast you grow!"
He is fixin' wires and things
On th' poles along th' road.
"I'm su'prised," sez he to me,
"How you've fattened up and growed!"

Then he puts some funny things
On his bootlegs, an' he walks
Right straight up that pole, he does—
An' he's workin' while he talks:
"How's yer ma?" sez he to me,
An' I say: "She's well today."
Then he comes a-walkin' down,
Gist like climbin' poles was play!

When pa takes me down to town,
Genruly I see him there
Right in front of Baltuff's store,
Sitting on a wobbly chair;
An' I say to him: "Hullo!"
While my pa is standin' by.
"How are you?" sez he to me.
"I am very well," sez I.

Then he lafs and sez: "Well, well!
Here's a nickel for sum gum!"
And I git it of th' man,
An' commence to chew it, sum!
When I git growed up, I think
I will be a climber, too,
An' I'll say: "Hullo" to boys
Gist like Willyum Strawney do!

If the telephone girls of this town told half they know business would be brisk for the lawyers and the hairdressers. Let's see, hairdressers make switches, don't they? Speaking of pulling hair—but that's another story.

Legal Cases and Decisions

By A. H. McMillan

Telephone Construction in Oklahoma.

1. How high should telephone wires cross highways and railroads in Oklahoma?
2. In crossing a railroad right-of-way, should poles be set on the right-of-way?
3. What distance should telephone poles be set from section lines on Oklahoma public roads?
4. Is it necessary in this state to get permission to build telephone lines along roads?

1. There is no specified distance that telephone wires must be strung above the ground in crossing either highways or railroads in Oklahoma. The crossing must, of course, be at such a height as to not interfere with the use of either the railroads or highways. On a railroad it would have to be high enough to allow the highest freight car or locomotive with a man on top to go underneath. Over the highway it would have to be such a distance from the ground as to permit a load of hay or similar load with driver to go underneath. What that height is you must determine at your peril.

2. In crossing a railroad right-of-way the pole should not be set upon it if it can be avoided. If it is necessary to set poles upon a railroad right-of-way, permission of the company should first be obtained.

3. There is no provision as to the distance poles should be set from section lines on public roads in Oklahoma. They should be set in the highway.

4. The statutes of 1903, section 1066, confer upon telephone companies in the state a right-of-way over lands and the right to use the public grounds, streets, etc., subject to the control of municipal authorities as to what lands should be crossed and as to where poles should be located. Rights-of-way may also be acquired by condemnation proceedings in the same way that railroad companies are authorized to acquire them. The only permission you therefore need to acquire is the direction of the municipal authorities as to where you should locate your poles.

Service Outside Employment.

A telephone company and a power company made an agreement which provided that either might attach its wires to the poles of the other by paying a rental therefor. The telephone company transferred its wires from a pole of the power company to a pole of its own above five feet away. Then the foreman of the telephone company attached to the power company's pole a cable seat for use in splicing the telephone company's cable. The use of the pole was convenient but not necessary to the telephone company. There was nothing to show that the telephone company or power company knew that the pole was being so used. An employe of the telephone company was injured while on the pole.

The day of the accident the company's foreman said to the linemen that they would go down and splice the cable, and they all went together to the place. The foreman took his place on the cable seat and after watching him a while the lineman said he guessed he would go up and help him, and received no reply. The lineman then ascended the pole, stood on the upper cross-arm and handed the sleeves to the foreman as he needed them. After working in this way about twenty minutes, the foreman put the bag containing the sleeves on the other side of him, which put them out of the lineman's reach; and after looking on a while the lineman said he guessed he would go down, and in doing so was injured.

He brought suit against the telephone company. The court held that the voluntary offer of the lineman to help did not put him outside the limits of his employment; that the foreman's act in ataching the cable seat to the power company's pole amounted to an adoption of it as a means of access to the work to be performed and that the telephone company was required to make the place safe for its employees, including the plaintiff. A judgment for the plaintiff was affirmed by the supreme court of New York. Miner vs. Franklin County Tel. Co., 75 At., 653.

Injury to Cable Through Public Improvements.

The Reynolds County Telephone Co., at Piedmont, Mo., by permission of the Common Council, laid a 75-pair lead cable in the bottom of a sewer. The cable was protected by means of a cement case in which it was laid. Later the city authorities concluded to widen the sewer, and for that purpose took out the wall on the north side and removed the cable. The cement put in as a protection to the cable was hard and in removing it the workmen used picks. One workman struck the cable with the point of his pick and made a hole in it. This let water into it, which circulated among the wires and caused the loss of the cable.

The telephone company sued the city, which was given a judgment. On the company's taking an appeal, the decision was affirmed. The court held that the permission granted the company was not binding, as only two of the four members of the board of aldermen were present when the resolution granting it was adopted, so that the meeting was illegal. It was also held that the fact that the president of the company saw the work going on from day to day without objection prevented the company from claiming that the work was negligently done. It was held that the city was only required to use ordinary care in removing the cable and was not liable unless it wilfully or recklessly injured the cable. Reynolds County Tel. Co. vs. Piedmont, 133 S. W., 141.

Injury to Experienced Linemen in Splicing.

An experienced telegraph lineman was injured in changing four feed cables on an elevated railway structure. He was using a monkey wrench in turning the bolt and it was claimed that he touched the end of it to a cable strung above it, thus making a circuit in some manner. The lineman died and his widow brought an action against the elevated railway company for damages. The jury brought in a verdict of $2,000.

To sustain the verdict it was necessary to find that there was evidence to justify the jury in thinking that the cable hung within a circle described by the end of the monkey wrench as it revolved with its jaws clenched on the end of the bolt. The court found that the evidence did justify such a verdict and sustained the judgment. In so doing it held that an experienced lineman does not assume the risk of injury from a splice negligently made by his employer in one of the cables, where nothing on the outside of the cable indicates any defect in the splice. Greene vs. Boston Elevated Railway Co., 93 N. E., 837.

Trimming Trees in Missouri.

I would like to have information concerning the trimming of trees by a telephone company in Missouri, in towns where the population is less than one thousand.

When we erected our lines most of them were "in the clear," but the trees have grown out into them and in some instances trees have been set out in the streets directly under our lines, and are now giving us a great deal of trouble.

Would we have the right to trim such trees even though the property owner objected?

Is it necessary to have the consent of the party each time we trim, or will getting permission once be sufficient for all time?

Do trees which are entirely in the street belong to the property owner or to the city?

Under the circumstances you mention, you would have the right to trim the trees in question even though the property owner objected. Such trimming should only be to such an extent as is reasonably necessary to protect your wires. This is true both of trees in the street and upon land of the property owner. You would not have the right, however, to go upon the property owner's land to trim his trees. Only such trimming as you could do from the street would be permissible.

As to the ownership of trees in the street, that depends upon the ownership of the soil of the street. The land upon which the street runs may be owned by the adjoining property owner, or by the city, depending upon the way in which title to the street was originally acquired by the city. Where the soil underneath the street belongs to the property owner, all the city owns is the street right over the soil. I cannot answer definitely the question in your case without knowing the full facts. See McMillan on Telephone Law, Chapter 14.

The Necessity of a City Franchise in Iowa.

It seems to me that I have seen some place in your valuable journal that it is not necessary in the state of Iowa to first get a franchise in a city or village to operate a telephone system. Kindly let me know where to find this, or give me the light on this subect through TELEPHONY.

What does the law in the state of Iowa say regarding "rubbernecking" on rural lines?

It is not necessary in Iowa to obtain a franchise from the city or village before having the right to operate in its streets. The right granted by the state laws is sufficient. See McMillan on Telephone Law, Section 56; Chamberlain vs. Iowa Telephone Company, 119 Iowa, 619; 93 N. W. 596. ("Rubbernecking" is not covered by the laws of your state.).

Organizing Mutual Associations in Ohio.

I have completed the organization of a mutual telephone association with over one hundred members with a membership fee of $35. We also expect to rent a few telephones to non-landowners. The money derived in this manner to go into a depreciation fund and also to reduce rates and assessments of shareholders. What would be the correct method of procedure in obtaining a local and state franchise and also incorporation papers under the laws of Ohio? Please give legal reference on the above. And to what extent does the utility act affect the association?

The questions you ask had best be referred to your private counsel, as he will have to superintend the work of incorporating your company. It has been held that a telephone company, upon its incorporation, becomes vested with a franchise from the state to use the public roads and highways and across any of the waters within the limits of the state, by the erection of the necessary fixtures including posts, piers, or abutments for sustaining the wires of such lines, provided that such work shall not be so constructed as to incommode the public in the use of roads or highways or endanger or injuriously interrupt the navigation of waters. Taking in renters would probably make you a "common carrier," fully subject to the Commission. See Zanesville vs. Zanesville Telephone and Telegraph Company, 64 Ohio, 67; Macklin vs. Home Telephone Company, 24 Ohio Circuit Court Reports, 446.

Wisconsin Commission Rules that Rebuilding of Plant Justifies Increase in Rates.

The Wautoma & Mt. Morris Farmers' Telephone Co. has been allowed a material increase of rates by the Wisconsin Railroad Commission on account of the increase in cost an improvement in service resulting from the rebuilding of its plant. Rates in force were $1 per month for either business or residence telephones on single or party lines. The company entirely rebuilt its system inside and outside, increased the number of its subscribers, and improved the quality of its service. It applied for permission to charge the following rates: Single line business, $1.50 per month; business telephone and one residence telephone on same line for same party, $2.50; single party residence, $1.25; residence telephone on party line, not to exceed four parties on one line, $1; extension telephones, 50 cents per month; extension bell, 10 cents per month, and rural lines, $15 per year.

An inventory showed a cost new of $13,527, equivalent to about $61.70 per subscriber, and about $82.30 per mile. The report of receipts and expenditures, the former being given separately for each class of service, showed total receipts, $1,024.75, expenses, $637.

A computation of the probable returns at the new rates, maintaining the old rate of $1.25 per month for rural service, and estimating that toll business would double, giving $120 annual revenue against the $60 reported for the preceding year, indicated a total revenue of $3,074. On the basis of the six months' reported expenses under the new conditions were $1,274, or $5.77 per subscriber per year. But the commission considers that the growth or increase would not immediately affect salaries and wages, and assumed a fair annual expense of $1,306, or $6.11 per subscriber, under the conditions of increased service. Comparison with other plants showed that $6.11 per subscriber is reasonable.

Some utilities have a much higher expense than this and others lower, but telephone companies in this class have, as a rule, an expense of from $5 to $7 per subscriber. Adding depreciation at 6½ per cent. and interest at 7 per cent. on $13,627 investment, the commission arrives at total annual charges of $3,189.64. A computation of a probable increase in revenue under the new rates shows that total revenue would probably only slightly exceed the estimated expense, and accordingly the petition was allowed by the commission.

German Claims Honors for Multiplex Telephony.

A communication by Ernst Ruhmer of Berlin, Germany, to the London *Electrician*, March 31 issue, stated that in the spring of 1908 he succeeded in transmitting over a line between his laboratory and house five separate, simultaneous conversations, without any disturbance.

The article describes the method of accomplishing this by propagating high frequency currents from the several transmitters over a wire to which the transmitting elements were connected through induction coils. A separate receiving station was tuned to respond to each of the several transmitting circuits. The article is illustrated with a diagram and a photograph.

Rural System Becomes Employment Agency.

Farmers in the vicinity of Red Cloud, Neb., who are short of hands and laboring men who are out of work are to be put in touch with each other through the medium of a free telephone employment bureau service just inaugurated for their benefit. The farmer who has use for a man simply calls the operator and makes his wants known. She scans a list of laboring men who have registered with her, and telephones to one immediately. The farmer and the man are connected over the line and the bargain made with the loss of little time. Laboring men who want work call the exchange and are put in touch with farmers who need help. The plan is proving a great aid to farmers and is looked upon by them as a useful innovation in rural telephone service.

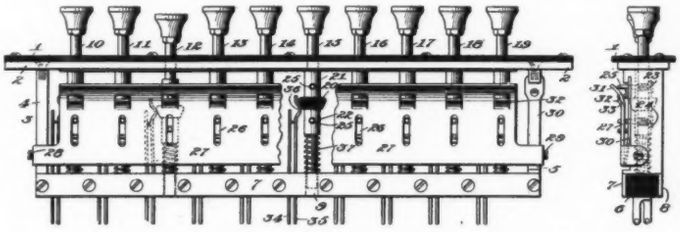
From the Patent Office

Max W. Zabel

Electrical Switch.

J. L. Wright, Washington, D. C., patent 991,590, May 9, 1911, assigned to North Electric Co., Cleveland, O.

A selective key has but two operative positions, the circuit closing position and the released position. A plate 27 is designed to co-operate with pin 25 to hold any button depressed after it is once actuated. Positive means consisting of the tongue 32 are provided, so that a positive release of any depressed button may take place when any button is pressed down further than its circuit closing position by having the pin 25 engage this tongue 32. The purpose of the invention is to avoid holding a button in a depressed position when another button is being depressed as sometimes happens, it is claimed, when no positive additional releasing means are provided.



Desk Instrument.

C. L. Williams, Parkersburg, W. Va., patent 991,583, May 9, 1911.

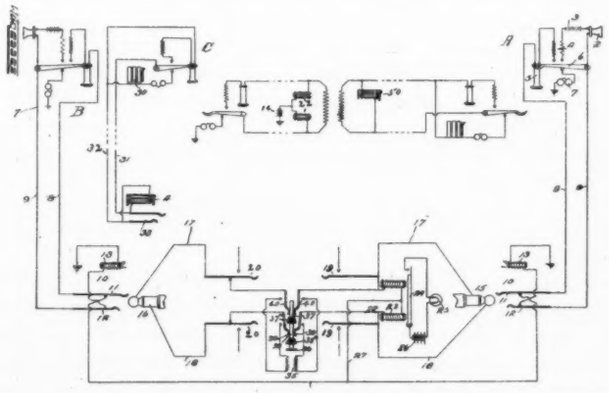
A receiver holder is set forth herein in which the desk set is provided with a sort of lazy-tongs bracket arrangement to support the receiver, so that the receiver may not be held in the hand of the subscriber when using the desk telephone. This lazy-tongs arrangement is also shown herein in a modified form in which a counter weight is provided to balance the projecting receiver.

Telephone System.

H. P. Clausen, Chicago, Ill., patent 994,302, June 6, 1911, assigned to Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.

A common battery system set forth herein which is designed to accommodate interconnecting apparatus to interconnect magneto and common battery lines.

The removal of the receiver by the subscriber *A* operates the annunciator *13*. Upon ringing the called subscriber, the ringing current from the grounded ringing generator at "Central" passes over the line conductor through his grounded bell. When both plugs *15* and *16* are inserted the supervisory lamp *25* is lighted by reason of the double relay *23* and the single armature *24*. When conversation is terminated and either party hangs up, the lamp again lights. Either coil *23*, however, can operate the armature to call the operator.



To provide for the connection of a magneto line a repeating coil *35* may be inserted by the switch *36*. A clearing-out drop *50* is bridged across the calling side of the repeating coil, while the clearing-out relay *22* remains connected with the other end of the cord circuit.

Separator for Storage Batteries.

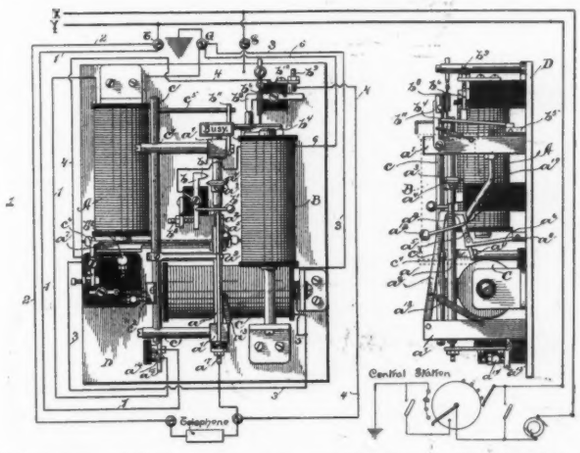
A. F. Madden, Newark, N. J., patent 985,045, Feb. 21, 1911, assigned to The Electric Storage Battery Co., Phila.

A storage battery plate separator consists of a sheet of hard rubber having a vast number of minute slits cut so that the material between the slits is inclined, and having the portions of the sheet between the successive slits offset. The separator is impervious to the loose material from the plates, but permits the passage of electrolyte.

Selective System for Party-Line Telephones.

Wm. M. Bruce, Jr., Springfield, O., patent 994,500, June 6, 1911, assigned to Amer. Automatic Telephone Co., Rochester, N. Y.

A selective party line system set forth herein uses three electromagnets, *A* the step-up magnet, *B* the selector magnet, *C* the clearing out magnet. The first magnet steps up the selector, the second closes the local circuit, and the third effects the release. The step-up device is shown at *a* and is arranged to drop by gravity when released. The rod *a* has a contacting device, a^3. A pivoted pawl a^5 operates the step-up rod. A switching contact device *b* is shown slidably connected with the selector magnet. The armature b^4 is adapted to contact with the circuit closer b^8 which is adapted, when released, to establish an electrical connection with the contact point b^9. In the normal position of the selector armature, b^4, the circuit closer b^8 is held out of electrical contact with the point b^9. Further details will be apparent.



Individual Selective Lock-Out Device.

Wm. M. Bruce, Springfield, O., patent 994,371, June 6, 1911, assigned to Amer. Automatic Telephone Co., Rochester, N. Y.

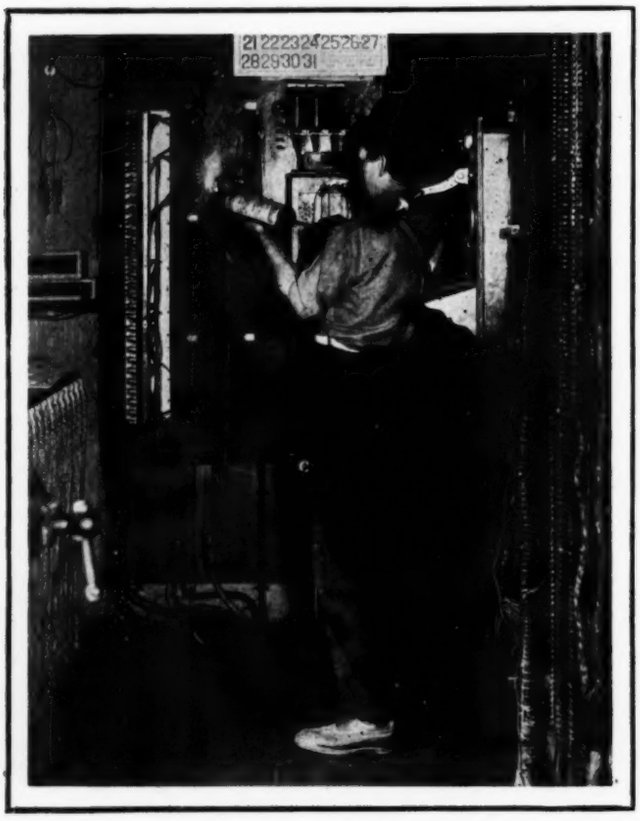
A series of impulses sent over a main line from an ordinary alternating current ringing generator operate a step-up device at each subscriber's station. A single electromagnet serves to step up and release the device, the release taking place by gravity.

From Factory and Salesroom

Conventions: North Dakota, Bismark, August 15, 16; Mississippi, New Albany, July 17, 18.

Handling Electric Fires.

At one time it was thought to be impossible to handle electric fires without great danger of the person applying the extinguishing fluid being killed or seriously shocked, as the current would come back to him through the extinguishing liquid. Anyone who has had electrical experience understands that water is a splendid conductor of electricity. There was also danger of the electric equipment being almost, if not entirely, ruined by the use of extinguishing methods such as have been in general use for the past forty or fifty years. Telephone manufacturing companies, and especially those making terminal equipment, have gone far toward minimizing the possibility of fire from lightning and sneak currents, which, in the early days, were a menace to telephone service. However, as one



How the Van Wert Fire Was Stopped.

of the leading manufacturers put it, "no one can make equipment fool proof," and as long as employers are negligent and do not comply with the requirements, or rules and regulations laid down for them, just so long will companies have trouble with fires. It is not an uncommon thing for heavy lightning, or current from highly charged electric wires that have come into contact with the telephone wires, to solder or fuse across the protectors and set a switchboard afire.

At the time the Interborough Railway Company of New York was placed in operation, it had a number of bad electric fires, and some of the officers became very apprehensive as to the final outcome. Fearing a bad accident or general conflagration, which would not only interfere with the operation of the road, but also act against the popularity of the service which they were trying hard to establish, a bonus of $50,000 was offered to anyone who would invent a fire extinguisher that would successfully extinguish arc fires. A gentleman, who at that time was in the dry cleaning business in New York City, invented a gas that would successfully break an electric arc. He was unable to apply the gas when wanted without difficulty, and the plan was, therefore, not pronounced a great success. Later on another inventer produced a "dry liquid," that is, a liquid which does not contain any moisture, and is, therefore, safe to use on electric machinery, it being the carrying agency for conveying the gas to the fire, thereby making it possible to fight a fire from a safe distance of say thirty to forty feet. This extinguisher has been generally adopted by the Subway companies of New York, by a number of the other electric transportation companies of the East, by oil, paint and varnish companies, and by a number of steam railways, manufacturers and other interests in general.

The writer has witnessed a number of interesting tests. One of them was to submerge a dynamo in a jar of this extinguishing fluid and operate it the same as though it were operated on the usual basis. Another was to submerge a bank of lamps in the fluid with open wiring and operate them while submerged. Another was to take a pail of gasoline, ignite it, allowing it to burn until the gasoline began to boil, and then extinguish it.

A number of companies which have had actual experience with this extinguisher gave a good account of it in service. Through the courtesy of the Home Telephone Company, of Van Wert, Ohio, we have had a photograph taken showing Mr. Henry Harmon, a blacksmith, of that city, as he appeared in the act of extinguishing the fire that occurred in the terminal frame of its switchboard. Mr. Longwell, manager of the company, states that its toll lines between Van Wert and Fort Wayne, Ind., became crossed with the transmission lines of the Ohio Railway Co. Current at 33,000 volts was conveyed over the telephone line, and, arcing through the terminals, set them and the switchboard afire. The operator on duty called for assistance. Mr. Harmon, who happened to be going by, went into the exchange building, used the "Pyrene" fire extinguisher, and put out the fire, making it possible for the company to go right ahead with its operations practically the same as if no fire had occurred.

Telephone men all over the United States who have heretofore been using water, soda and acid, dry powder tubes, killfyre, asbestos blankets, pails of sand, water pails, stand pipes with hose attached, and other means too numerous to mention, will undoubtedly be pleased to get an extinguisher which they know can be used with safety, not only on their switchboard, but also used freely in their cables, terminals, on the furniture, records and office equipment without danger.

Several months ago, The Indianapolis Telephone Co., of Indianapolis, Ind., had a fire in one of its terminal heads. The fire was extinguished with a chemical extinguisher. It was afterwards dried out by baking, but for nearly a year the wires in that cable, one after another, became grounded and unfit for use. When the cable was finally cut out of commission, it was found that the chemical had almost completely destroyed the paper insulation.

"Pyrene" fire extinguisher, which is making such a good record for itself, is handled by The Electric Appraisal & Inspection Company, of Cleveland, O. Mr. Jas. B. Hoge, president of the company, acting in the interest of the Telephone Fire Insurance Exchange, made and had made for him, some six months ago, tests to prove or break down the claims made for the extinguisher. All of these tests proved satisfactory. A number of them were made by the best engineers in the electrical field. "Pyrene" was found to contain no moisture, to be a non-conductor of electricity not capable of being frozen at 90 degrees below zero, and was also found to be very effective on oil, gasoline and carbide fires.

Kellogg Supplies and Equipment Catalog.

What is said to be the most complete catalog of telephone supplies and equipment ever issued is now being distributed by the Kellogg Switchboard & Supply Co., Chicago. It covers all the important items used in telephone work and every item is illustrated, a brief description given, together with its code word.

For the manager of any telephone company this catalog is very convenient on account of its completeness. The index is comprehensive and the whole book is so arranged that the telephone man, can by referring to it, order equipment exactly suited to his needs. The catalog is of the standard Kellogg size and can be inserted in the Kellogg binder.

A copy of this valuable book, together with the rest of the Kellogg bulletins should be on the desk of every telephone buyer. In the event that you do not have any of these publications a copy will be sent on request.

A Valuable Copper Booklet.

Telephone operators, manufacturers or others interested in copper wire, or copper in any form, brass, bronze, or oreide, will find it to their advantage to procure a copy of the Michigan Copper Brass Company's latest list. This list is "something different" from the usual run of metal lists and is one of the best issued, being filled with valuable tables, schedules, wire gauges, average costs of copper for a number of years, etc., etc., in great detail. The booklet possesses both completeness and excellence in printing and binding. It is indexed in the manner of the ordinary dictionary, that is by thumb notes on the side.

A copy may be had by addressing Charles Sparks, care The Michigan Copper & Brass Co., Detroit, Mich.

The Manufacture of Crossarms.

Among the largest manufacturers of crossarms in the world is the American Crossarm Co., of Chicago. This concern has made a specialty of the manufacture of crossarms for ever forty years and has brought its output to a high standard. The company's mills are in the Cascade Mountain regions of Washington, for the manufacture of Washington fir, and in Virginia, North Carolina, Mississippi and Louisiana for the manufacture of yellow pine. A. F. Crosby, sales manager of the American Crossarm Co., has contributed an interesting article to TELEPHONY on the manufacture of fir arms, which appears in this issue.

Stromberg-Carlson Company's Lamp Shade.

The Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., is putting out a handsome red and black translucent shade for electric lamps. The shades are made to resemble those of wrought iron, and are exceedingly tasty. They bear the Stromberg-Carlson sign on each side. The company will be glad to send specimens without charge to those of the trade who ask for them. They are worth sending for.

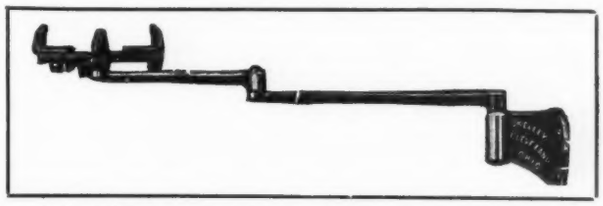
F. M. SLOUGH, formerly connected with the National Carbon Co., of Cleveland, Ohio, in the capacity of general salesman, has severed his connection with that concern and is now identified with the Dean Electric Co., as salesman in the state of Indiana. Mr. Slough's experience along electrical lines has been quite varied, although chiefly devoted to telephone interests. He will make his headquarters for the present at 411 South Sixth St., Elkhart, Ind., at which point mail will reach him regularly.

THE INTERNATIONAL ELECTRIC METER CO. announces that it is now in a position to repair and calibrate ammeters and voltmeters of any make, on short notice. The company has recently issued a pamphlet, which will be sent free on request, describing its No. 18 meters for telephone exchanges.

The Skelley Telephone Bracket.

Several very useful styles of telephone bracket arms are made by the International Specialty Manufacturing Co., of Cleveland. Type No. 1, which is intended for the support of one telephone, has an extension of 17 inches and swings in a ten-inch radius. There is no possible chance for the telephones held by this bracket to slip or fall off, owing to the firm support given the base of each telephone.

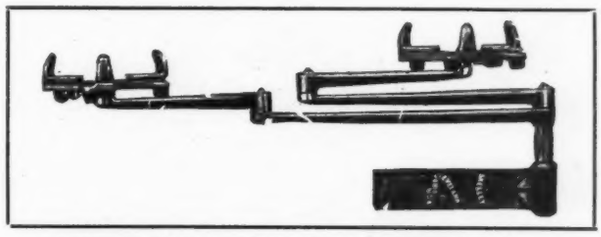
The bracket is composed of the fewest parts and has no complicated adjustment to get out of commission that would likely cause future trouble. The company particularly recommends this style to the busy man having need of but one telephone,—but under circumstances where two telephones are essential, style No. 3, as shown in the accompanying illustration, should be used.



Single Telephone Bracket—A Strong, Convenient Type.

This type has been so arranged that telephones may be swung in any position desired without interference. In cases where either telephone is in use at a desk, the remaining telephone can be used at an extension of 36 inches in the opposite direction.

It is claimed by the makers of these brackets that they will simplify telephone service considerably from the user's standpoint, and will appreciably reduce transmitter and receiver breakage for the telephone company. The Skelley bracket has been so designed that it will hold the telephone in a convenient position for its users. Inquiries are requested from interested companies, and a folder describing these telephone brackets, together with other matter, will be promptly sent.



A Handy Solution of the Two Telephone Problem.

ALFRED F. MOORE, 200-218 North Third street, Philadelphia, has issued his July calendar in the "Fair Phyllis" series. The card is done in colors and presents the attractive young woman propelling a canoe, with the following suggestion below: "When Phyllis guides her trim canoe, you wish that she'd make room for two!" Copies will be sent upon request.

The Rebuilt Telephone Equipment Co.

The Rebuilt Telephone Equipment Co. is now located at 2050 West 21st street, Chicago, and is in a position to fill all orders for rebuilt standard equipment. Edward C. Stoeffhaus, who is now at the head of the company, is widely known in the telephone field and is especially fitted for the work he has undertaken, having been connected with the rebuilt telephone business for seven years, and knowing the game from A to Z. The Rebuilt Telephone Equipment Co. in its new quarters has ample facilities for supplying telephone companies with rebuilt equipment that is as good as new.

In the Rural Line Districts

The telephone war that has distracted the people of Good Hope and vicinity for some time past has been amicably settled and service has been resumed on all lines centering in that village.—*Avon (Ill.) Sentinel.*

The proprietor of our telephone plant, Mr. Reece, called a meeting of the patrons of the different lines last Saturday afternoon, to settle on a uniform fee for the service, which we would naturally think, could be settled in a few minutes. But it required the entire afternoon, until sundown, and we hear that some laughable suggestions were made. One resolution was offered that Mr. Reece should not be allowed to put in any more phones. Now how was that? And we hear that some other proposals were just as laughable. Some seem to think that Mr. Reece has a real bonanza—that his income is around three thousand per annum and can furnish cheap service, but forget that his expense is close onto the heels of the income. Mr. Reece speaks highly of a number of the patrons who demonstrated every word of common sense judgment. Anyone knows that low rates means ragged lines, etc. Every patron should be willing to pay a right fee, that the lines could all be built up with good poles, and the service in first-class working order. It would add in looks to our already fine country around our village, and increase the value of our farms.—*Riley Correspondence Manhattan (Kan.) Mercury.*

The Smith Brothers, former owners of the Bushton Telephone Exchange, and recent graduates of the Chiropractic Institute of Davenport, Iowa, are now located at Excelsior Springs, Mo., and are practicing their profession. They seem to be doing well.—*Bushton (Kan.) News.*

Telephone toll service will be timed beginning with June 1. The longest you can talk after that will be three minutes, that is unless you are willing to dig up an extra sum for the time you consume over that amount.—*Story City (Ia.) Herald.*

The new telephone connection, that has just been made between Halls Summit and Lebo is doing the work nicely. One can talk with some satisfaction and the people certainly appreciate the good connections.—*Burlington (Kan.) Republican.*

The management of the Grundy Center Telephone Exchange are getting out a new telephone directory. The list of patrons has grown so that it now requires 1000 directories to supply them all.—*Grundy Center (Ia.) Democrat.*

The County Phone manager is here tearing things up, and when he gets through, the service will no doubt be much improved.—*Adeline Correspondence Polo (Ill.) Press.*

Rhame has a new light, water and phone organization.—*Fargo (N. Dak.) Forum.*

Poles are being put up for the new telephone system which will be installed here. We expect to have the long distance lines here this summer.—*Mercer Letter in Rhinelander. (Wis.) North.*

THE MUTTONHEAD CLUB
As drawn by Opper in Chicago Examiner
NO, CENTRAL, I AIN'T JOLLYING. I CAN TELL BY YOUR VOICE THAT I'LL LIKE YOU. WON'T YOU MEET ME THIS AFTERNOON? ALL RIGHT, I'LL BE AT THE POST OFFICE AT FIVE O'CLOCK. I'LL WEAR A WHITE ROSE IN MY BUTTON HOLE, AND CARRY A NEWSPAPER IN MY HAND!
I MUST HURRY! AH, THAT VOICE!
I KNEW YOU AT ONCE!
DON'T STOP ME! I WANT TO COME IN!
MUTTONHEAD CLUB
F. Opper